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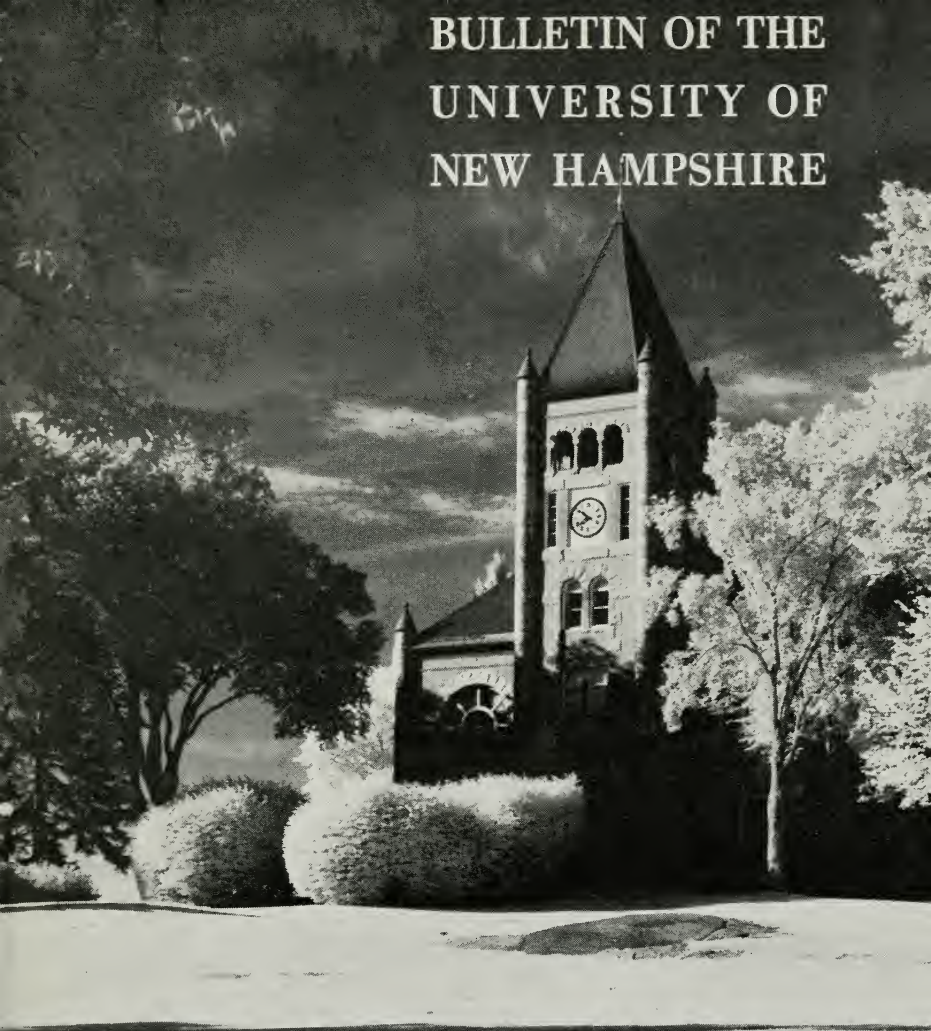

General Information
Issue — 1962-1963

University Calendar

1962-1963

Semester I

September 18 Orientation for freshmen begins
September 21 and 22 Registration for all students
September 24 Classes begin
November 20–25 Thanksgiving recess
November 26 Classes resume
December 18–January 2 Christmas recess
January 3 Classes resume
January 28–February 5 Final examinations for Semester I

Semester II

February 11 and 12 Registration for all students
February 13 Classes begin
April 6–14 Spring recess
April 15 Classes resume
June 3–11 Final examinations for Semester II
June 16 Commencement

General Information
about the
University of New Hampshire

Volume LIII Number 3 December 1961

The Bulletin of the University of New Hampshire is published twice in December, January, and February, and once each in March, April, July, and August.

Introduction

OF all New England's colleges and universities, few are as ideally located as the University of New Hampshire. Durham is a small town at the tidehead of the Oyster River, centered midway between metropolitan Boston and the White Mountains of New Hampshire. To the south, one and one-half hours away, are the cultural opportunities which an urban area can offer: the theater, symphony, opera, museums. To the north, an equal distance in time, mountain climbing, skiing, and scenery. And twenty minutes to the east, the beaches and rocky coasts of New Hampshire and Maine. Thus, Durham, one of northern New England's earliest settlements, lies at the center of the nation's most historic region.

In a region long noted for higher education, the University of New Hampshire has brought a new dimension, that of public higher education. Founded first in 1866 at Dartmouth College in Hanover, the New Hampshire College of Agriculture and Mechanic Arts moved to Durham in 1892 to take up a separate existence as one of the nation's growing body of land-grant colleges. Thirty-one years later the institution became the state university and was renamed the University of New Hampshire, composed of the colleges of Agriculture, Liberal Arts, and Technology.

Throughout its history the University has sought to combine the philosophy of the land-grant movement with that of liberal education. The College's first professor was a chemist; its first president in the Durham location, a classicist; its most renowned faculty member, a pioneer in the study of rare earths, including uranium. Today students in the College of Agriculture take as much as two-thirds of their work in the arts and basic sciences, while students in technology combine study in the social sciences and humanities with professional training.

Undergraduates at the University are a cosmopolitan group. Approximately three-fourths of the students come from within the state and are, for the most part, from the top two-fifths of their high-school graduating classes. The remainder of the students, who usually must meet somewhat higher standards, come from a majority of the states and some 35 foreign nations.

The Programs of Study

THE University of New Hampshire offers three broad areas of study — agriculture, liberal arts, and technology. The work of the University is so divided that when the student decides on the general field of study he wants to pursue, he is guided into a program which will meet his needs.

The student may devote his four years to a single college or he may cross college lines and take courses in several areas. This is possible because, as a university, the University of New Hampshire makes all its academic programs available to meet the requirements of every student.

Freshmen are assigned to one of the three colleges within the University, but they need not make the final choice of their whole program until the sophomore year. Entering freshmen are given a series of tests which furnish information to enable the faculty to help them choose the curriculum for which they are best suited. Faculty advisers and the counseling staff also use these tests to help the students solve their educational and personal problems.

Certain courses are taken by all students. English is required in the freshman year. Women students are required to take physical education for four semesters. Men students, except those who have been in the military service, are required to take physical education for two semesters and military training during their first four semesters.

The University has maintained a healthy teacher-student ratio despite rising enrollments. In 1916, a faculty of 55 members served a student population of 666. This very favorable 1:11 ratio has increased only slightly in the intervening years. Today's resident faculty of 302 members provides one teacher for every 13 students.

Of the resident faculty, all except 46 members have reached professorial rank. Doctoral degrees have been earned by 55 percent of the faculty, and many have national and international reputations in their respective fields.

The College of Agriculture

The objectives of the College of Agriculture are to give students a fundamental education in the biological, physical, and social sciences and to provide specific technical training according to student interest in Agriculture, Agricultural Engineering, Forestry, or Home Economics.

Agriculture is broader than the production of food and fiber. It includes, in addition to production, the processing, distributing, and marketing of agricultural products and the servicing of production. A wide range of career opportunities is provided for adequately prepared college graduates. Governmental agencies, both advisory and regulatory, offer other career opportunities for graduates of agricultural colleges.

Many graduates of the College of Agriculture continue their education beyond the Bachelor's degree and obtain advanced degrees to qualify for specialized positions in teaching, research, extension, industry, or civil service. The program of study for a student who plans to enter graduate school will differ from that of a student who intends to accept a position immediately after completing the Bachelor's degree. The intent of the college is to help the student select a career and to prepare him or her for competence and leadership in that career.

Upon admission to the College of Agriculture the student will declare what degree he or she seeks. The following degrees and curricula are available:

Bachelor of Science in Agriculture
- Agricultural Business and Marketing
- Agricultural Science
- Agricultural Technology

Bachelor of Science in Agricultural Engineering
- Agricultural Engineering

Bachelor of Science in Forestry
- Forestry
- Forest Game Management

Bachelor of Science in Home Economics
- General Home Economics
- Clothing and Textiles
- Foods, Nutrition and Industrial Management
- Home Economics Education

The student may select a curriculum and an area of specialization at the time of registration as a freshman or wait until the sophomore year to make these decisions. The student is assigned an adviser from one of the areas of specialization as follows: Biochem-

istry, Agricultural Economics, Agricultural Engineering, Agronomy, Animal Science, Botany, Dairy Science, Entomology, Forestry, Home Economics, Horticulture, Mechanized Agriculture, Poultry Science, Pre-Veterinary, or Teacher Preparation in Agriculture.

For a Bachelor of Science degree in Agriculture, Forestry, or Home Economics, each candidate must complete 136 semester credits: for a Bachelor of Science degree in Agricultural Engineering, 144 semester credits are required.

Thompson School of Agriculture

The Thompson School of Agriculture, a unit of the College of Agriculture, offers a two-year non-degree program of study. Any high-school graduate of good character or any student who has completed a minimum of two years of high school and is eighteen years of age or over may be admitted. Two years of class work and two years of summer placement for supervised agricultural work experience are required for graduation.

Instruction in the Thompson School is designed to prepare students for careers in the broad field of agriculture. Typical examples are: farming, farm managers, herdsmen; greenhouse superintendents, ornamental horticulture and landscape technicians; sales and service work with feed, fertilizer, chemical, and equipment companies; soil conservation, fish and game conservation; foremen, forestry, technicians, and skilled workers in dairy processing and distributing plants. The program is vocational in nature. Because graduates of this school receive practical experience as well as an academic training, they are able to secure employment as trained workers. The six majors offered are: Agricultural Business, Dairy Science, Forest Technology, General Agriculture, Horticulture, and Poultry Science.

The College of Liberal Arts

The College of Liberal Arts seeks to provide students with an understanding of the fundamental fields of knowledge and to develop the student's critical judgment and creative abilities. The College believes that, through a liberal education, a student may achieve an understanding of the heritage of civilization and the realities of the present which will provide perspective and intellectual strength in meeting obligations to the future.

Within this context, the student may pursue a broad, liberal education in the *General Liberal Arts* program or more specialized training in the *Prescribed Curricula* and *Teacher Preparation* pro-

grams. The degree of *Bachelor of Arts* is conferred upon students who complete successfully the General Liberal Arts program. The degree of *Bachelor of Science* is conferred upon students who complete successfully the requirements of the Prescribed Curricula. Each student must complete 128 semester credits and maintain an average of C to become a candidate for a degree. Upon admission to the College, a student is assigned an adviser who assists him in developing an individual program best suited to his ability and interests.

General Liberal Arts

The General Liberal Arts program offers the student an opportunity to achieve a sound liberal education. The student's first two years are devoted to gaining a breadth of knowledge through acquaintance with the content and ways of thinking in several disciplines: the biological and physical sciences, the humanities, and the social sciences. In his last two years, the student is encouraged to develop his individual interests and skills through concentration in a particular subject or field of knowledge. Such concentration is the first step toward acquiring specialized knowledge and professional training. Beyond the General Liberal Arts major requirements, a student has the opportunity to select from among a wide variety of courses in developing a program suited to his individual interests.

In his first year, a student's schedule in the General Liberal Arts program includes an introduction to contemporary civilization, a course in composition and literature, and either biology or a course in physical science chosen from specified courses in chemistry, geology, mathematics, physical science, or physics. His fourth course is an elective. Students often use the elective course to explore the field in which they anticipate enrolling as a major Freshmen men and women are required to take physical education. Freshmen men must also take military training.

The second-year student in the General Liberal Arts program selects three of his courses from the following sophomore group requirements, one from each group:

Group I	*Group* II	*Group* III
Introduction to The Arts	Biology	Economics
English Literature	Chemistry	Government
American Literature	Geology	Psychology
Humanities	Mathematics	Sociology
Foreign Languages	Physical Science	
Introduction to Music Literature	Physics	
Philosophy		

In addition, sophomores may schedule one or two elective courses.

Each student who enters the General Liberal Arts program must pass a test of general competence in a foreign language before graduation from the University. Any questions on the nature of this test should be addressed to the Chairman of the Department of Languages.

A student may choose a major at the end of his freshman year or during his sophomore year. A minimum of 24 semester credits is required in the major, although some majors may include one or more additional courses which do not count for major credit. A major may be taken in any of the following areas: The Arts, Bacteriology, Biology, Botany, Chemistry, Economics, Education, English, Entomology, General Physical Science, Geology, Government, History and Literature, Foreign Languages, Mathematics, Music, Philosophy, Physics, Psychology, Sociology, Speech and Drama, or Zoology.

A student who shows unusual interest and ability in his major field may apply for independent study and honors work. In the social sciences, superior undergraduate students may be admitted to a program leading to the master of arts degree, either in preparation for college teaching or further graduate study in a particular field of knowledge.

Some careers, such as dentistry, law, and library science, require additional study in professional schools. Students who intend to pursue such programs of post-graduate professional education are advised to obtain a baccalaureate degree in the General Liberal Arts program before beginning their professional training.

Business and Professional Training

During the freshman year, students following one of the Prescribed Curricula take courses or develop programs of courses very similar to those of students following the General Liberal Arts program. During the first year, those who are going into scientific fields usually take two sciences instead of one. To provide breadth of experience for students following a prescribed curriculum, one year's work is required in both the humanities and the social sciences. In each of the prescribed curricula, the sophomore, junior, and senior years are devoted, in large part, to required courses directed toward specialized, professional training.

The prescribed curricula are: Business (with Accounting Option), Hotel Administration, Medical Technology, Nursing, Occupational Therapy, Pre-Medical, Secretarial, and Social Service. A detailed description of the prescribed curricula in these fields may be found in the University Catalogue.

Business Curriculum

The Business curriculum provides for professional preparation in marketing and distribution, finance, or labor and personnel administration. Many of the graduates of the Business curriculum are successfully filling responsible positions with accounting, banking, insurance, merchandising, and manufacturing concerns.

Hotel Administration Curriculum

The Hotel Administration program gives basic preparation for careers in professional management and technical specialist positions in the hotel, motel, club, and food service fields. To insure that graduates know both the basic skills as well as the broad field of hotel administration, each student is required to complete at least two summer programs of on-the-job experience.

Medical Technology Curriculum

Public health and medicine depend more and more upon the laboratory, and positions in medical technology are available in hospital laboratories, physicians' and surgeons' clinics, and in health department laboratories. Students take their freshman, sophomore and junior years' work at the University and their last year's work at the Mary Hitchcock Memorial Hospital School of Medical Technology, Hanover, New Hampshire. Through the program, the student may qualify for the B.S. degree and examination for the Medical Technologist's certificate administered by the Registry of Medical Technologists of American Society of Clinical Pathologists.

Nursing Curriculum

Any student who is interested in nursing as a career is encouraged to consider the Nursing curriculum. It affords opportunity for examinations for registration as a nurse and enables the student also to secure a college degree. The breadth of training beyond that usually received in a hospital training school is increasingly in demand, particularly for those who aspire to executive or supervisory positions. The student must satisfactorily complete three years of work in residence at the University of New Hampshire, and then graduate from a school of nursing approved by the University. The length of the training period will vary with the several schools of nursing.

Occupational Therapy Curriculum

An ally to the medical profession, occupational therapy is any activity, mental or physical, prescribed by a physician and administered by a registered therapist to aid in the recovery or the rehabilitation of the patient. The successful practice of occupational

therapy requires not only thorough academic preparation but also suitable personality combined with judgment, dependability, tact, tolerance, patience, and will to serve. Students planning on this curriculum must take a series of qualifying examinations preceding the sophomore year. The results of these will be used in advising the student whether or not he or she may continue in the curriculum. At the completion of the requirements of the curriculum, the student spends a minimum of ten months in student affiliation in approved hospitals or services under the direction of a registered occupational therapist. When this internship is satisfactorily completed, the student is entitled to a Certificate of Occupational Therapy. The student is then qualified to take examination for registry in the American Occupational Therapy Association.

Pre-Medical Curriculum

Young men and women who are interested in careers as physicians or surgeons may select the Pre-Medical curriculum. Students who successfully complete this curriculum will be eligible for admission to Class A medical schools. However, owing to the large number of applicants for admission to medical schools, usually only those students who stand in the upper third of their class can expect to be admitted.

Secretarial Curriculum

A large number of college women find pleasant and profitable employment in secretarial positions of private, professional, commercial and industrial offices. The curriculum combines semi-professional secretarial training with the general education essential to success in responsible secretarial positions.

Social Service Curriculum

The Social Service curriculum offers pre-professional training leading to work in the following fields: family case work, child care and placement, settlement and neighborhood house, institutional work for defectives and dependents, state and local welfare work, probation, correctional school and prison service, Y.M.C.A. and Y.W.C.A. service, municipal playground direction, child guidance clinics, community chest work.

Teacher Preparation

Students may prepare for teaching in the secondary schools of New Hampshire and neighboring states either in a General Liberal Arts major or in one of the specialized teacher preparation curricula.

Only those preparing to teach in the elementary schools will be majors in Education. These students will spend three years in the General Liberal Arts curriculum, with the senior year devoted to

professional study and practice teaching. Most of those planning to teach in the secondary schools will major in a particular subject-matter area, such as biology, government, history, etc. Professional courses for state certification are taken as electives.

Those students who are interested in the specialized areas of art, music, or physical education may complete the requirements for the Bachelor of Science degree in one of these prescribed curricula. Women who desire to prepare themselves as playground directors, etc., may elect to follow the Recreation Option within the Physical Education Teacher Preparation program.

All these curricula include educational psychology, principles of learning, principles of teaching, principles of education, subject area methods courses, and supervised teaching. Prescribed programs of study for preparing teachers in art, music, and physical education may be found in the University Catalogue.

The College of Technology

The College of Technology offers several programs of study in the areas of engineering, physical sciences, and mathematics. The Bachelor of Science degree is awarded after successful completion of specific curricula in Chemical Engineering, Chemistry, Civil Engineering, Mathematics, Mechanical Engineering, and Physics. While mathematics and the physical sciences form the core of each of these curricula, work in the humanistic-social and life science areas is also either required or available as electives, since the College feels that a knowledge of the social structure in which the professional-scientific effort is to be used is vitally important.

The freshman year for all students in the College of Technology is the same. While students are asked to elect a departmental area for advisory purposes, it is possible to transfer to other curricula without loss of credit or time during the year. Specific courses include mathematics, general chemistry during the first year, English, istry, engineering drawing, physics, and a course in the humanities.

In the sophomore year all Technology students continue their studies in mathematics, including differential equations and physics. The curricula of all departments include also the opportunity for an elective sequence in the humanistic-social area. Engineering students further add to their core of basic courses, statics and dynamics of mechanics, fluid mechanics, and thermodynamics.

The junior and senior years provide further sequence opportunities in the professional disciplines, as outlined in the paragraphs which follow.

Chemical Engineering

This field is that branch of engineering which involves the application of chemistry, physics, mathematics, and fundamental engineering principles to the design, construction, and operation of equipment for carrying out chemical processes on an industrial scale at the lowest possible cost. Courses include quantitative analysis, organic chemistry, physical chemistry, chemical engineering principles, chemical engineering economics and plant design, chemical engineering thermodynamics, metallography, chemical engineering project, and fundamentals of electrical engineering.

Chemistry

This curriculum is intended to prepare the student for the career of a professional chemist in industry and to give a good foundation for graduate study leading to original and independent research. Courses include organic and inorganic chemistry, analytical chemistry, physical chemistry, German, and a study of chemical literature. A thesis is required.

Civil Engineering

The profession of civil engineering, the oldest of the major branches of engineering practice, embraces the functions of planning, design, and construction of buildings, bridges, dams, transportation projects, and public works in general. Courses include surveying, strength of materials, engineering materials, theory of determinate and indeterminate structures, steel design, electrical engineering fundamentals, general geology, highway engineering and transportation, soil mechanics, reinforced concrete design, structural engineering, hydraulic and sanitary engineering.

Electrical Engineering

This curriculum provides instruction intended to prepare the stustudent for graduate study or to begin his career in professional electrical engineering. Courses include electromagnetics, electric circuits and networks, electronics, control systems and servomechanisms, engineering materials, thermodynamics, fields, engineering economics.

Mathematics

The Technology curriculum in Mathematics consists of a thorough grounding in calculus, followed by advanced work in algebra, analysis, applied mathematics, and geometry. Such a program meets the requirements currently set by graduate schools for admission to graduate study in mathematics. It also furnishes the basic mathematical training required of mathematicians in industry and govern-

ment. Courses include mathematical statistics, advanced calculus, higher algebra, mathematical analysis, differential geometry, topology, theory of differential equations, French, and German.

Mechanical Engineering

The Mechanical Engineering curriculum is intended to prepare young men and women either for graduate study or to enter the field of professional mechanical engineering. Training is provided in the organization and utilization of principles, personnel, and physical resources for the solution of mechanical engineering problems. Courses include manufacturing processses and design, electrical engineering, engineering materials, machine design and analysis, heat and power systems, engineering economics.

Physics

The Technology curriculum in Physics is intended to offer basic training in fundamentals, supplemented by laboratory work in the various branches of physics. Such a curriculum prepares its graduates for basic research in industry, the various government research organizations, or for continued academic study toward advanced degrees. Courses include advanced calculus, physical mechanics, electricity and magnetism, experimental physics, atomic physics, nuclear physics, theoretical physics, and German.

All curricula in the College of Technology also provide opportunities for technical elective courses selected from the major field of study of the student or from other departments in the College of Technology or from the other colleges of the University. Other elective courses must be chosen from the social-humanistic fields.

All departments also offer the superior student an opportunity to participate in an Honors Program. This program allows the student working with his adviser to create a course of study emphasizing advanced work in some selected area or areas allied to his professional choice. Admission is by invitation of the department with consent of the Dean of the College.

Other Programs of Study

The Graduate School

With the objective of bringing together faculty and qualified students for scholarship and research, the Graduate School has offered instruction since 1903. The graduate student is given opportunity to specialize in some field of knowledge and to develop a maturity of thought and attitude toward his professional field, so that both

his professional and cultural life are enhanced. The faculty of the Graduate School is drawn from the three colleges of the University.

Programs leading to the Master's degree and the Doctor of Philosophy degree are available in many departments. Full information may be obtained by writing to the Dean of the Graduate School.

The Summer Session

Courses are offered in six-week and eight-week summer programs to meet the needs of a variety of people, such as teachers and school principals, college students who seek to progress faster or make up deficiencies, and those who wish to take courses for personal interests. The faculty includes members of the three colleges supplemented by specialists from other institutions.

Further information may be obtained by writing to the Director of the Summer Session.

University Extension Service

This arm of the University conducts adult education programs anywhere in the state where there is sufficient demand, making instruction available on a college level. It also takes its classes into industrial plants for specialized technological instruction or it will conduct classes in subjects of general interest. Full information may be obtained by writing to the Director of the University Extension Service.

Reserve Officers Training Corps

In cooperation with the Federal Government, the University maintains Reserve Officer Training Corps Army and Air Force units as a part of the program to provide trained reserve officers for the military services. All men students, unless they have already had military service, are required to take military training during their freshman and sophomore years. Advanced ROTC, taken by students interested and chosen during the junior and senior years, prepares the student for a commission as a reserve second lieutenant.

Outside the Classroom

As important as the classrooms and laboratories may be, a great University would be incomplete without cultural activities outside the regular program of instruction. The University conducts a number of cultural functions, both for the benefit of students and faculty and for the people of the state.

The center of the University's cultural life is the Library where there are 298,000 books and a collection of more than 2,600 phono-

graph records. The Library has a branch for plant and animal sciences in Nesmith Hall, one for chemistry in James Hall, and one for engineering in Kingsbury Hall. The Library is a U.S. Government Depository Library. In the fall of 1958, the Library moved into a new $1,400,000 building.

The University has several collections housed in various buildings. They include one which illustrates the zoology, geology, entomology, and Americana of New Hampshire; one devoted to more than 500 costumes dating from Revolutionary times; another to fabrics; an extensive china and glass collection; a bird collection; and one devoted to testing machinery used by a New Hampshire professor more than 50 years ago when he developed what is known as the Kingsbury thrust bearing.

An outstanding cultural program in music includes a number of concerts by student vocal and instrumental groups and recitals by several faculty members. In this same field the University sponsors a special concert series each year which brings professional musicians to the campus from the nation's opera and symphony halls. During the past year, for example, this series included the Pittsburg Symphony Orchestra, Harpsichordist Ralph Kirkpatrick, I Musici, Cellist Leonard Rose, and Cesare Valetti, the Metropolitan opera tenor.

Drama is offered several times during the year by student groups in the new theater in the Paul Creative Arts Center. The 735-seat theater has been described by an authority as one of the best in the East. Regular concerts are played from a 64-bell electronic carillon from the tower of Thompson Hall.

There are many public lectures, both by faculty and off-campus speakers. A Distinguished Lecture Series brings outstanding men of arts, letters, science, and the humanities to the campus. These individuals lecture, meet with classes, and talk informally to student and faculty groups. Alumni, through their annual fund, support an Alumni Visitor program which brings equally prominent men and women to the campus, usually for longer periods, to speak publicly and to meet with classes. Recent visitors in these two series have included Aaron Copland, Justice William O. Douglas, John Kenneth Galbraith, Clement Atlee, Paul Henri Spaak, Henry Cabot Lodge, Norman Cousins, and Margaret Mead.

The Department of The Arts presents a continuously changing program of exhibitions, which are selected to appeal to a variety of interests. These exhibitions are shown in the University Gallery in the Paul Creative Arts Center and in the Exhibition Corridor at Hewitt Hall.

Methods of Admission

UNIVERSITY admissions policy is designed to provide for the admission of those students whose background, achievement, aptitude, and motivation demonstrate that they have the qualifications for doing college work.

The University admits in-state residents who have a scholastic record which ranks them in the upper two-fifths of their graduating class, are recommended and/or certified, and have an appropriate college preparatory background. The number of out-of-state students admitted each year is limited and selection is made primarily on the basis of superior academic achievement in secondary school. Such traits as character, leadership, and initiative are taken into account.

All candidates for admission to the University are required to submit the results of the College Entrance Examination Board Scholastic Aptitude Test taken during the senior year. The December, January, or February series are preferred.

Applicants should not apply for admission until after the first ranking period of the senior year. Non-residents should apply no later than March 15, while in-state students should apply no later than spring. No application can be considered which is not complete at least a month before the start of the orientation program which begins on September 18, 1962.

Formal application papers, which must be filed with the Admissions Office, may be obtained from secondary school offices in New Hampshire or from the Admissions Office at the University. Tuition deposits — $15 for residents of New Hampshire and $40 for non-residents — should be sent with applications and are applied against the first semester tuition bill if the applicant is accepted. The tuition deposit is returned in the event the applicant is not admitted. It is forfeited only in the event the applicant is admitted and withdraws after acceptance or does not enter.

It is assumed that students from out-of-state will have reasonable financial backing since only limited scholarship aid is available for non-resident applicants.

A word about New Hampshire residence. All applicants living in New Hampshire are required to submit a notarized form containing a statement to the effect that their parents are legally domiciled in the state. Students admitted from states other than New

Hampshire or from foreign countries are considered as non-residents throughout their entire attendance at the University unless the parents have gained *bona fide* residence in New Hampshire.

Preparation for College

While 16 units of college preparatory work are strongly recommended, the University will accept 12, including at least four of English, one of natural science, and one of social science. The following minimal specific subject requirements represent the least acceptable, rather than the most desirable college preparatory program:

	Agriculture	*Liberal Arts*	*Technology*
English	4 units	4 units	4 units
Language		2 units of a single foreign language	
Mathematics	2 units	2 units	3½ units, including algebra, plane geometry, and trigonometry
Science	1 unit	1 unit	2 units (chemistry and physics)
Social Studies	1 unit	1 unit	1 unit
College Preparatory Electives	4 units	2 units	1½ units

The University participates in the Regional Cooperation Program of the New England Board of Higher Education in which students from other New England states are given priority in certain curricula, as well as special tuition consideration. Information may be obtained from the New England Board of Higher Education, 31 Church Street, Winchester, Mass., or from the admissions offices of the various New England state universities.

Early Decision

The University is willing to give prospective applicants an indication of admission, based on scholastic attainment for three years under certain circumstances. This plan is specifically appropriate for a well-qualified student who has made the University his first choice. Further details may be obtained from the Admissions Office.

Early Admission; Advanced Placement

Secondary school students who show unusual promise may be admitted early to the University. While it does not actively recruit candidates for college entry before graduation from secondary school, the University will, upon recommendiation of the school, review the credentials of those whose academic programs have been unusually successful and extensive. Social and emotional maturity also are considered in selecting candidates for early admission.

The University will recognize unusual secondary school work by means of advanced placement and credit for those who have taken especially enriched or accelerated courses before entering college. Applicants qualify for such credit by satisfactory achievement on University-approved placement examinations. Further information may be obtained from the Admissions Office.

Special Students

Under special circumstances individuals may be permitted to register for certain courses without having been admitted formally to the University. Normally these individuals are adults whose objective may be realized by taking one or two courses for a semester or two. Such individuals are designated as special students and are not considered to be working toward a degree at the University.

Advanced Standing

Qualified candidates for advanced standing from approved institutions may be admitted. Their status is tentatively determined by the quantity and quality of the work completed at the institution from which they come.

In transfer, credits are allowable for courses which are appropriate to the curriculum for which the student is admitted and for courses in which grades above the lowest passing grade were received.

While the University is pleased to encourage the competent transfer applicant who has valid and legitimate reasons for desiring the transfer to New Hampshire, it cannot encourage the applicant with a history of academic or personal difficulty. University admissions policy restricts consideration for transfer to those students with satisfactory academic, as well as personal, records.

Expenses

THE cost for the freshman year at the University averages about $1,250 for a resident of New Hampshire and $1,700 for a non-resident.

Tuition is $380 ($800 for non-residents). Any student registering for eight credits or more per semester pays the full tuition. Any student registering for fewer than eight credits pays $17.50 per credit hour.

Board is $360. Freshmen are required to board at the Commons Dining Hall. There are cafeterias in the Commons and in the Memorial Union for upperclassmen.

Room rents average $230. The University has nine residence halls for women and seven for men. Undergraduate women are required to live in a residence hall or sorority house unless they live at home. Undergraduate men are not required to live in residence halls, but will be accommodated to the extent of the space available. Room rents vary from $165 to $280.

Books cost about $75. These and classroom supplies may be purchased at the University Bookstore.

There is a Memorial Union assessment of $12 and an activity tax of $10 which includes a subscription to the undergraduate newspaper and yearbook, and membership in Student Union, Student Government, and class activities.

Personal expenses average $200. These will vary with the needs of the individual student, and include clothing, laundry, recreation, incidentals, and travel.

Financial Aid

A financial aids program assists able and promising students who are unable to meet their educational expenses entirely from their own or their family's resources.

Tuition Grants and Scholarships

A resident of New Hampshire is eligible for consideration for a tuition grant. The amount varies from $100 to full tuition, and the basic consideration is financial need. There are scholarships available for both resident and non-resident students. The basis of these awards may be either scholastic attainment, meeting particular requirements as outlined by the donor, participation in extra-curricular activities, or other. No awards are made until a student has been admitted to the University, has submitted an application for a grant or scholarship, and his parents have filed a parents' confidential statement with the College Scholarship Service at Princeton, New Jersey.

In-state students may secure applications for grants or scholarships as well as the parents' confidential statement from high school principals or guidance counselors. Out-of-state and transfer students may secure applications for grants or scholarships from the Financial Aids Office, UNH, and the parents' confidential statement from high school principals or guidance counselors.

Loans

There are two loan funds administered by the University: the UNH Loan Fund and the National Defense Student Loan Fund. Financial need must be clearly demonstrated and loans may be used only for expenses incurred in pursuing a college education. Applications for loans may be secured from the Financial Aids Office, UNH.

Employment

Various types of employment are usually available to students wishing to work part time. However, freshmen and transfer students are not encouraged to work during their first semester.

For additional information, contact the Financial Aids Office. All applications are due prior to May 1.

Student Life on Campus

COLLEGE life is not confined to studying. Likewise the University's concern for the student goes beyond the classroom. Several special services are provided by the University to help the student in his four years on campus. These functions and others of general interest are described briefly in the following paragraphs.

Health

The University Health Service, located in Hood House, includes a well-equipped out-patient clinic for diagnosis and treatment of ambulatory patients and a modern hospital of 26 beds. Registered nurses are on duty at all times, and individual health guidance is given through personal conferences with the University physicians. In addition to the University Health Service, group accident and sickness insurance may be purchased.

Counseling

The Counseling Service assists students in self-evaluation and in the development of sound plans and objectives. Personal counsel and guidance are offered to those students facing problems of emotional and social adjustment.

Testing and Placement

Essentially the University's bureau of vocational services, this department assists seniors in securing positions through contacts with prospective employers. Admission and orientation testing is conducted, as well as individual testing for guidance purposes.

Military Service Affairs

Men students reaching their 18th birthday are required to register for Selective Service. The Military Service Affairs officer is the representative of the University in all matters concerning the Selective Service System and the branches of the armed forces.

Memorial Union

The University's Memorial Union is a community center for students. A gift of alumni and friends of the University, it was designed to fulfill three functions: a living memorial to the men and women of

New Hampshire who have served in the armed forces, a college union, and a statewide conference center. With its extensive and well-planned facilities, it serves as a focus for all extra-curricular activities on the campus.

In addition to its meeting and conference rooms, lounges, music listening and TV rooms, cafeteria, snack bar, games area for table tennis, billiards, and bowling, and its spacious Strafford Room utilized for a variety of social functions, the Union provides permanent headquarters for several major student organizations.

The facilities of the Memorial Union are effectively adapted to the recreational needs of the campus by a well-rounded, leisure-time program of social and cultural activities planned by the various student committees of Student Union.

Religious Activities

Three churches in the town of Durham and a number of student organizations offer the opportunity for students to participate in religious activities.

The Durham Community Church welcomes students to its Sunday services of worship at 9:15 and 11:00 a.m., and to share church activities through student affiliate membership.

The needs of Episcopal students are met by a chaplain who is also rector at St. George's Church. Services are held on Sundays at 8:30 and 10:30 a.m. and 6:00 p.m.

The parish of St. Thomas More serves Roman Catholic members of the community. Sunday Masses are held at 8:00, 10:30, and 11:30 a.m.

These are the student organizations which help to promote religious life on the campus:

Canterbury Club, an association of Episcopal students.

Christian Science Organization, for students of the Christian Science faith.

Hillel Society, an organization of Jewish students. Activities include religious services, holiday observances, discussion groups, and the maintenance of a library relative to Jewish study.

Newman Club, an organization for Catholic students. Its activities include corporate communions, discussion study groups, lectures, drama, parties, and dances. A reading room is provided.

Phanarion Society, an organization for students of the Greek Orthodox Church.

Christian Association, an organization for Protestant students. It is sponsored by the United Protestant Association which represents Protestant churches, parents of students, alumni, faculty, students,

and the state YMCA and YWCA. The Christian Association is directed by a full-time chaplain to students.

Inter-Varsity Fellowship, an organization to promote Christian fellowship, Bible study, and prayer.

Office space for the Catholic, Episcopal, and Protestant chaplains and meeting rooms for the religious organizations are provided by the University in New Hampshire Hall.

Books and Supplies

The University Bookstore carries all textbooks, allied reading material, and classroom supplies which students need. The store also has a large selection of paperbacks which are of general interest to college students.

Living Accommodations

The University has nine residence halls for women and seven for men. All rooms are heated, lighted, and furnished. The individual student must furnish his own bed linen, blankets, towels, and desk lamps. A house director is in charge of each residence hall.

All undergraduate women are required to live in a residence hall or a sorority house unless they live at home. Women students are required to be in their residence halls at certain hours in the evening.

Undergraduate men are not required to live in residence halls, but will be accommodated to the extent of space available. There are no curfew hours for men.

The University also operates 98 apartments for faculty and married students.

Board

All freshmen are required to board at the Commons Dining Hall unless they live at home or work for their meals. The aim of this regulation is to safeguard the health of freshmen by offering skilled dietetic supervision in selection and preparation of their food. The Commons is equipped with the best appliances for cooking and serving on a large scale. Board for freshmen in 1961-1962 was $180 per semester on the basis of three meals a day, seven days a week.

Cafeterias in the Commons and the Memorial Union are open to all students of the upper classes who may desire to take advantage of the moderate price and high quality of food available. In the Commons cafeteria in 1961-1962, 21-meal weekly tickets were $14.

Personal Cash

Students are urged to arrange personal checking accounts or to place money on deposit in the Business Office until needed in order to avoid possible loss from keeping on hand considerable sums of money. Such banking arrangements will facilitate payment at registration periods. The Business Office will accept and cash student checks.

Student Conduct

The University believes living and learning go hand in hand. Therefore, student behavior which detracts from this central purpose will be discouraged, while behavior which seriously threatens it will not be tolerated. For these reasons and for their own human and social value, high standards of personal conduct are expected of students both on and off campus. Any student who is unwilling or unable to meet these standards will be asked to leave the University.

No attempt is made to spell out all types of misconduct. The University relies instead on the good taste and maturity of college students and on their assumption of full adult responsibility for the consequences of their acts.

Motor Vehicles

Student use of motor vehicles is not encouraged, but it is recognized that there may be important reasons why a student needs to have his own transportation on campus.

Operation of motor vehicles is restricted to juniors, seniors, and graduate students; married students; legal residents of Durham; those who commute from off campus; students with a serious physical handicap; and second-year students in the Thompson School of Agriculture.

All motor vehicles must be registered with the University. There are two kinds of registration: a $5 permit which allows use of certain campus parking facilities, and a free permit which allows use of the vehicle in Durham but not on campus. There are fines for violations of regulations.

Student Activities

THERE are many opportunities for students to participate in activities outside the classroom. They include athletics, dramatics, music, publications, student government, and social organizations. If there is a good balance between work in the classroom and work in activities, the whole college experience will be enriching. Without attempting to enumerate all of the activities, a few of the general areas are noted.

Athletics

New Hampshire students, both men and women, are encouraged to participate in intercollegiate sports or in intramural events. The athletic program stresses physical fitness, as well as the development of sportsmanship and a keen competitive spirit.

Varsity sports, with intercollegiate schedules, include football, cross country, basketball, hockey, winter track, skiing, baseball, lacrosse, spring track, golf, and tennis. The University belongs to the Yankee Conference. There are freshman teams with scheduled competition, in most of these sports.

For women students there is intercollegiate competition in field hockey, basketball, skiing, badminton, tennis, and lacrosse.

There are comprehensive intramural and club programs for those who do not participate in the intercollegiate programs. For men there are opportunities for team play in touch football, fall and spring track, bowling, volleyball, basketball, tennis, golf, and softball. Women students may participate in dance club, rifle club, square dancing, skating, skiing, and riding club.

The intercollegiate and intramural programs are in addition to the required physical education courses which all students must take.

Dramatics

The theater in the new Paul Creative Arts Center has been described as one of the best educational theaters in the East. It provides students with an opportunity to participate in an extensive program in drama production under the sponsorship of the Department of Speech and Drama. The student dramatic society, Mask and Dagger, presents three full-length plays each year, as well as a number of shorter productions. The drama experience includes play-writing, acting, directing, costuming, make-up, lighting, staging, and design.

Music

Music for fun and music for credit is part of the offering of the Department of Music. There are opportunities in a variety of ways for students to sing, play, and conduct. There are two glee clubs and a choir. There are two bands, a symphony orchestra, a string ensemble, and several instrumental and vocal ensembles.

Two major music programs are produced each year: the Christmas Concert and the Spring Concert. The latter usually is devoted to one major classical work. In addition, each musical unit presents a special concert during the year. There are recitals by senior music majors and by the faculty of the Department of Music.

Publications

New Hampshire students have their own weekly newspaper, *The New Hampshire*, and an illustrated annual, *The Granite*, published by the senior class.

Student Government

This organization, to which all undergraduate students belong, acts as the official representative body for the students and coordinates the activities of the student body with the faculty. The purpose of Student Government is to promote individual and collective responsibility among students.

The work of Student Government is carried on by the Student Senate, chosen from all housing units and the commuting students.

Other Organizations

There are about 40 recognized student organizations for those interested in some special academic field, such as chemistry or sociology, or in non-academic activities, such as skiing and hiking, dramatics, music, or radio. Included are some 20 national honorary societies, among them Phi Beta Kappa and Phi Kappa Phi.

Fraternities and sororities are an important part of campus life. There are 14 fraternities and 6 sororities. Most of them have their own homes in which the members live.

The Campus

UNIVERSITY lands in Durham comprise approximately 1,700 acres, largely in farms and woodlots. The main campus occupies about 170 acres. Main Street of Durham divides the campus roughly in half. South of it are the men's dormitories, administrative offices, and all major classroom buildings; to the north are the women's dormitories and the fraternity and sorority houses.

The oldest building on campus is Thompson Hall (1892), the administration building. Approximately one-half of the University's physical plant was completed before World War II; most of these buildings follow a modified Georgian style of architecture. The newer buildings are contemporary in design. The effect is a harmonious one, however, and the visitor's impression is that the campus belongs to the tradition of New England.

Since 1949 the University has doubled the capacity of its educational plant. This building program will continue without pause until 1972 when the campus will have reached peak utility for a student body of about 7,000, nearly double its present size. Newest of the buildings are the Paul Creative Arts Center, a $2,250,000 structure which houses music, the arts, and drama, and the Spaulding Life Science Building, housing bacteriology, biochemistry, and zoology. Both were opened in 1960.

Also erected since World War II have been the University's engineering building, the Memorial Union recreation center, University Library, a nutrition laboratory, nine dormitories, and a housing development for married students and faculty. On the drawing board are a new dining hall and a women's dormitory.

Further Information

The University welcomes visits of prospective students and their parents. University offices are open from 8:00 a.m. to 12 noon and 1:00 to 4:30 p.m. Monday through Friday. Offices are closed Saturday and Sunday except by previous appointment. It is suggested that appointments for interviews with University officials be made in advance.

Correspondence should addressed to the following:

Admission
DIRECTOR OF ADMISSIONS
Thompson Hall

Graduate School
DEAN OF THE GRADUATE SCHOOL
Spaulding Life Science Building

Summer Session
DIRECTOR OF THE SUMMER SESSION
Commons

Thompson School of Agriculture
HEAD, THOMPSON SCHOOL OF AGRICULTURE
Putnam Hall

University Extension
DIRECTOR OF THE UNIVERSITY EXTENSION SERVICE
Commons

University of New Hampshire
Durham, N. H.

Bulletin of the University of New Hampshire

Catalogue Issue for 1962-1963

Vol. LIII April 1962 No. 9

The Bulletin of the University of New Hampshire is published 10 times a year, twice in December, January, and February, and once in March, April, July, and August. Second-class postage paid at Durham, N. H.

Foreword

This issue of the Bulletin of the University of New Hampshire provides a detailed description of curricula, courses, and requirements for study at the University.

Other information about the University — its history, its general philosophy and objectives, its buildings and equipment, its student personnel services, student organizations, methods of admission, and student fees and expenses — will be found in the *General Information 1962-1963* issue of the Bulletin.

Detailed information about financing an education at the University may be obtained by writing to the Financial Aids Office, Thompson Hall.

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University Calendar

1962 - 1963

Summer Session

1962

June 25	Monday	Registration, eight-week session and first four-week session
June 26	Tuesday	Classes begin
June 30	Saturday	Classes meet to make up for registration day
July 4	Wednesday	Holiday, no classes
July 9	Monday	Registration, six-week session
July 10	Tuesday	Classes begin for six-week session
July 14	Saturday	Classes meet, to make up for July 4 holiday and registration day
July 20	Friday	First four-week session ends
July 23	Monday	Registration and first day of classes, second four-week session
Aug. 17	Friday	Summer Session ends

First Semester

Sept. 16	Sunday	2:00 p.m. Residence halls open for incoming freshmen
Sept. 17	Monday	9:00 a.m. Testing of freshmen not tested during summer
Sept. 18-23	Tues.-Sun.	Orientation
Sept. 18	Tuesday	First Faculty meeting
Sept. 20	Thursday	2:00 p.m. Residence halls open for upperclassmen
Sept. 21	Friday	8:30 a.m. to 12:00; 1:30 to 4:00. Registration of all students, Field House. (Student must have consulted adviser and have approved program before he appears for registration.)
Sept. 24	Monday	8:45 a.m. Convocation; classes begin at 10:00 a.m.
Oct. 3	Wednesday	4:30 p.m. Last day to add most academic courses.
Oct. 20	Saturday	Homecoming
Oct. 22	Monday	4:30 p.m. Last day to drop courses
Nov. 12	Monday	9:00 a.m. Mid-semester reports for freshmen due in the Office of Registration and Records.
Nov. 20	Tuesday	6:00 p.m. Thanksgiving recess begins. Residence halls close at 7:00 p.m.
Nov. 25	Sunday	2:00 p.m. Residence halls open
Nov. 26	Monday	8:00 a.m. Classes resume
Dec. 18	Tuesday	5:30 p.m. Christmas recess begins. Residence halls close at 7:00 p.m.

1963

Jan. 2	Wednesday	2:00 p.m. Residence halls open
Jan. 3	Thursday	8:00 a.m. Classes resume
Jan. 28	Monday	9:00 a.m. Final examinations begin
Feb. 5	Tuesday	5:00 p.m. Final examinations end. Residence halls close at 7:00 p.m. for Semester I.

Second Semester

Feb. 10	Sunday	2:00 p.m. Residence halls open for Semester II
Feb. 11 12	Monday and Tuesday	8:30 a.m. to 12:00; 1:30 p.m. to 4:00. Registration of all students, Memorial Union Building. (Student must have consulted adviser and have approved program before he appears for registration.)
Feb. 13	Wednesday	8:00 a.m. Classes begin
Feb. 22	Friday	4:30 p.m. Last day to add most academic courses
Mar. 12	Tuesday	4:30 p.m. Last day to drop courses
April 1	Monday	9:00 a.m. Mid-semester reports for freshmen due in the Office of Registration and Records.
April 6	Saturday	12:30 p.m. Spring recess begins; Residence halls close at 2:30 p.m.
April 14	Sunday	Easter; Residence halls open at 2:00 p.m.
April 15	Monday	8:00 a.m. Classes resume
May 4	Saturday	Parents Day; classes end at 11:00 a.m.
May 30	Thursday	Memorial Day; no classes
June 3	Monday	9:00 a.m. Final examinations begin
June 11	Tuesday	5:00 p.m. Final examinations end; Residence halls close for Semester II at 7:00 p.m.
June 16	Sunday	Commencement Day

Board of Trustees

His Excellency, Governor Wesley Powell, ll.b., *ex officio*

Perley I. Fitts, b.s., Commissioner of Agriculture, *ex officio*

Austin I. Hubbard, b.s., President — Walpole, N. H.
December 20, 1944 to June 30, 1961

*Forrest M. Eaton, b.s., Vice President — Portsmouth, N. H.
July 1, 1959 to June 30, 1963

*Dean P. Williamson, b.s., Secretary — Concord, N. H.
July 1, 1960 to June 30, 1964

Frank W. Randall, b.s., ll.d., — Portsmouth, N. H.
July 1, 1936 to June 30, 1964

Mary S. Brown — Center Sandwich, N. H.
December 20, 1944 to June 30, 1963

Maurice F. Devine, ll.b., ll.d. — Manchester, N. H.
December 21, 1949 to June 30, 1962

George L. Frazer — Monroe, N. H.
July 1, 1957 to June 30, 1962

Bradford S. Boothby, b.s. — Union, N. H.
October 14, 1959 to June 30, 1963

J. Fred French — Manchester, N. H.
April 12, 1961 to June 30, 1965

Sinclair Weeks, a.b., ll.d. — Lancaster, N. H.
October 31, 1961 to June 30, 1965

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* Elected by alumni.

Officers of Administration

John F. Reed, *Acting President*

Jere A. Chase, *Assistant to the President*

Robert N. Faiman, *Dean of the College of Technology and Director of the Engineering Experiment Station*

Harry A. Keener, *Dean of the College of Agriculture and Director of the Agricultural Experiment Station*

David C. Knapp, *Dean of the College of Liberal Arts*

Allan A. Kuusisto, *Dean of the Graduate School and Coordinator of Research*

Norman W. Myers, *Treasurer*

C. Robert Keesey, *Dean of Students*

Robb G. Gardiner, *Associate Dean of Students*

Elizabeth A. McQuade, *Associate Dean of Students*

Donald E. Vincent, *Librarian*

Harry R. Carroll, *Director of Admissions*

Paul E. Schaefer, *Registrar*

Samuel W. Hoitt, *Director of the Cooperative Extension Service*

Administrative Staff

George W. Bamford, *Alumni Fund Director*

John D. Bardwell, *Audio-Visual Coordinator, University Extension Service*

Doris Beane, *Assistant for Institutional Studies*

Kathleen R. Beckingham, *Counselor*

Burnell V. Bryant, *Alumni Executive*

Robert G. Congdon, ed.d., *Counselor*

Henry W. Corrow, Jr., *Extension Editor*

William D. Crandall, m.d., *Assistant Director of University Health Service*

John E. Enos, *Assistant News Editor*

Francis H. Gordon, *Manager, University Housing*

Jane E. Griswold, *Director of Dining Services*

L. Franklin Heald, *Director of Informational Services*

Dayton M. Henson, *Manager, University Bookstore*

Charles H. Howarth, m.d., *Director of University Health Service*

Frederick M. Jervis, ph.d., *Director of Counseling*

C. Robert Keesey, *Director of Memorial Union*

Reginald W. King, *Manager, Printing Service*

Eugene H. Leaver, *Assistant Superintendent of Properties and Supervising Architect*

Harold I. Leavitt, *Superintendent of Properties*

William W. Lothrop, ph.d., *Counselor*

W. Kent Martling, *Assistant Treasurer*

Paul H. McIntire, ed.d., *Director of Testing and Placement*

Harriet B. Nason, r.n., *Supervising Nurse*

Keith J. Nighbert, *Station Manager of WENH-TV, Channel 11*

Mary Lou O'Donnell, *Conference Coordinator, University Extension Service*

Ronald W. Olmstead, *Controller*

Richard C. Plumer, *News Editor*

Alfred T. Quirk, *Director of University Extension Service and Director of Summer Session*

Mary Semitros, *Alumni Recorder*

Russell C. Smith, *Purchasing Agent*

Jane B. Stearns, *Financial Aids Officer*

Albert D. Van Allen, *Director of University Development*

The University Faculty and Staff

As of February 1, 1962

ABELL, MAX F., *Extension Associate Professor Emeritus of Agricultural Economics*
B.S., Cornell University, 1914; Ph.D., *ibid.*, 1924. (1926-)

BABCOCK, DONALD C., *Professor Emeritus of Philosophy*
B.A., University of Minnesota, 1907; M.A., *ibid.*, 1908; S.T.B., Boston University, 1912. (1918-)

BATCHELDER, LYMAN J., *Instructor Emeritus in Mechanical Engineering, Woodshop* (1915-)

BEGGS, ANN F., *Extension Associate Professor Emeritus of Home Economics*
B.S., Nasson College, 1947. (1917-)

BEVAN, LAURENCE A., *Director Emeritus of the Cooperative Extension Service*
B.S., Massachusetts Agricultural College, 1913. (1946-)

BOWLER, EDMOND W., *Professor Emeritus of Civil Engineering*
S.B., Massachusetts Institute of Technology, 1914. (1920-)

BOWLES, ELLA S., *Publications Editor Emeritus*
Plymouth Normal School, 1905. (1943-)

CAMPBELL, WILLIS C., *Research Associate Emeritus, Engineering Experiment Station*
B.S., New Hampshire College, 1906. (1938-)

COULTER, CHARLES W., *Professor Emeritus of Sociology*
B.A., University of Toronto, 1903; B.D., Victoria College, 1909; M.A., Yale University, 1910; Ph.D., *ibid.*, 1914. (1934-

ELLIS, ELIZABETH E., *Extension Associate Professor Emeritus of Home Economics*
B.S., Teachers College, Columbia University, 1927; M.A., *ibid.*, 1929. (1929-)

HENNESSY, WILLIAM G., *Professor Emeritus of English*
A.B., Boston University, 1916; A.M., *ibid.*, 1924. (1923-)

HITCHCOCK, LEON W., *Professor Emeritus of Electrical Engineering*
B.S., Worcester Polytechnic Institute, 1908. (1910-)

HOWES, HORACE L., *Professor Emeritus of Physics*
B.S., Syracuse University, 1905; Ph.D., Cornell University, 1915. (1918-)

HUDDLESTON, ERIC T., *Professor Emeritus of Architecture*
B.Arch., Cornell University, 1910. (1914-)

JACKSON, C. FLOYD, *Professor Emeritus of Zoology*
B.A., De Pauw University, 1905; M.S., Ohio State University, 1907. (1908-)

LATIMER, L. PHELPS, *Associate Professor Emeritus of Horticulture*
B.S., University of California, 1921; M.S., *ibid.*, 1922; Ph.D., *ibid.*, 1926. (1926-)

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* Indicates part time devoted to Cooperative Extension Service.

† Indicates part time devoted to Agricultural Experiment Station.

Mills, Marian E., *Assistant Professor Emeritus of Botany*
B.S., Teachers College, Columbia University, 1917; M.A., *ibid.*, 1920. (1927-)

O'Brien, Daniel A., *County Agent Leader Emeritus*
B.S., Cornell University, 1913. (1920-)

†O'Kane, Walter C., *Professor Emeritus of Economic Entomology*
B.A., Ohio State University, 1897; M.A., *ibid.*, 1909; D.Sc. (Hon.) *ibid.*, 1932. (1909-)

Parker, Clifford S., *Professor Emeritus of Languages*
A.B., Harvard University, 1912; A.M., *ibid.*, 1914; Ph.D., Columbia University, 1925. (1931-)

†Phillips, Thomas G., *Professor Emeritus of Agricultural and Biological Chemistry*
B.S., Ohio State University, 1912; M.S., *ibid.*, 1913; Ph.D., University of Chicago, 1918. (1925-)

†Prince, Ford S., *Professor Emeritus of Agronomy and Agronomist Emeritus, Agricultural Experiment Station and Cooperative Extension Service*
B.S., University of Illinois, 1913. (1925-)

Sanborn, Mary L., *Assistant State Club Leader Emeritus*
Oread Institute, 1904. (1915-)

Smith, Lucinda P., *Associate Professor Emeritus of English*
A.B., Colby College, 1901; M.A., Boston University, 1934. (1919-)

†Smith, Todd O., *Research Assistant Professor Emeritus of Agricultural and Biological Chemistry*
A.B., Indiana University, 1910; M.S., New Hampshire College, 1917. (1910-)

Stevens, Henry B., *Director Emeritus of University Extension Service*
A.B., Dartmouth College, 1912. (1918-)

Taylor, Frederick W., *Director Emeritus of Agricultural Service Departments of the College of Agriculture*
B.S., Ohio University, 1900. (1903-)

Thames, Sarah, *Associate Professor Emeritus of Home Economcis*
B.S., Simmons College, 1930; M.A., Teachers College, Columbia University, 1942. (1945-)

Tonkin, John C., *Instructor Emeritus in Mechanical Engineering, Machine Shop* (1910-12, 1924-)

Yale, William, *Professor Emeritus of History*
Ph.B., Sheffield Scientific School, Yale University, 1910; M.A., University of New Hampshire, 1928. (1928-)

Abbott, Helen D., *Head Cataloguer*
A.B., Wheaton College, 1929; S.B., in L.S., Simmons College, 1930; A.M., Middlebury College, 1936. (1943-)

Abbott, Marguerite, *Associate Professor of Occupational Therapy*
B.S., Tufts University, 1948; M.A., Columbia University, 1957; A.P.D., *ibid.*, 1961. (1961-)

Adams, Gene W., *Instructor in Physics*
B.S., Agricultural and Mechanical College of Texas, 1960. (1961-)

Agenbroad, James E., *Cataloguer*
A.B., Miami University, 1956; M.L.S., Rutgers University, 1960. (1960-)

Agogino, George A., *Visiting Assistant Professor of Anthropology*
B.A., University of New Mexico, 1949; M.A., *ibid.*, 1950; D.S.S., Syracuse University, 1958. (1961-)

†Allen, Fred E., *Professor of Poultry Science and Veterinarian, Agricultural Experiment Station*
B.S., University of New Hampshire, 1932; D.V.M., Ohio State University, 1936. (1940-)

†Allen, Peter H., *Assistant Professor of Forestry*
B.S., University of New Hampshire, 1956; M.A., Duke University, 1958. (1960-)

Allmendinger, E. Eugene, *Associate Professor of Mechanical Engineering*
B.S., Nav. Arch., University of Michigan, 1941; M.S., Mech. Eng., University of New Hampshire, 1950. (1958-)

Alssen, Nicholas E., *Assistant Professor of Languages*
A.M., University of Michigan, 1953. (1961-)

Amazeen, Paul G., *Research Associate in Physics*
B.S., University of New Hampshire, 1961. (1961-)

Amell, Alexander R., *Associate Professor of Chemistry*
B.S., University of Massachusetts, 1947; Ph.D., University of Wisconsin, 1950. (1955-)

Andersen, Kenneth K., *Assistant Professor of Chemistry*
B.S., Rutgers University, 1955; Ph.D., University of Minnesota, 1959. (1960-)

Anderson, Charlotte K., *Assistant Librarian and Documents Librarian*
B.A., University of Michigan, 1935; A.B.L.S., *ibid.*, 1936; A.M.L.S., *ibid.*, 1951. (1943-)

Anderson, Paul S., *Instructor in Chemistry*
B.S., University of Vermont, 1959. (1961-)

†Andrews, Richard A., *Assistant Professor of Agricultural Economics*
B.S., University of Maine, 1949; M.S., Pennsylvania State University, 1951; Ph.D., University of Minnesota, 1959. (1959-)

Baier, Lee S., *Instructor in English*
B.A., Reed College, 1948; M.A., Columbia University, 1952. (1960-)

Baier, Nancy L., *Instructor in Physical Education for Women*
B.S., Pennsylvania State University, 1961. (1961-)

Ballard, Horace C., *Agricultural Agent, Belknap County*
B.S., Cornell University, 1936. (1949-)

Balomenos, Richard H., *Assistant Professor of Mathematics*
B.S., United States Merchant Marine Academy, 1952; M.A., New York University, 1956; Ed.D., Harvard University, 1961. (1961-)

Banks, Arthur S., *Instructor in Government*
A.B., Cornell University, 1951; A.M., George Washington University, 1952. (1960-)

Barraclough, Kenneth E., *Extension Professor of Forestry*
B.S., New York State College of Forestry, Syracuse University, 1921; M.F., Harvard University, 1940. (1926-)

Bartley, Clara H., *Research Associate in Bacteriology*
B.S., Miami University, 1923; M.A., University of Michigan, 1926; Ph.D., University of Kansas, 1935. (1945-)

Bartley, Irving D., *Assistant Professor of Music and University Carilloneur*
B.M., Syracuse University, 1935; M.M., *ibid.*, 1938. (1945-)

Barton, Philip S., *Professor of Agricultural Education and Head, Thompson School of Agriculture*
B.S., University of New Hampshire, 1928; M.Ed., *ibid.*, 1938. (1939-)

Bassett, John H., *Instructor in Economics and Business Administration*
B.S. in B.A., Boston University, 1959; A.M., *ibid.*, 1960. (1960-)

Batchelder, Gerald M., *Research Associate Professor, Engineering Experiment Station*
B.S., University of New Hampshire, 1950; M.S.C.E., Purdue University, 1952. (1953-)

Batcheller, Joseph D., *Associate Professor of Speech and Drama*
A.B., Carnegie Institute of Technology, 1936; A.M., University of Minnesota, 1938; Ph.D., *ibid.*, 1942. (1944-)

Batho, Edward H., *Associate Professor of Mathematics*
B.S., Fordham University, 1950; M.S., University of Wisconsin, 1952; Ph.D., *ibid.*, 1955. (1960-)

Beasley, Wayne M., *Research Assistant Professor and Project Coordinator, Engineering Experiment Station*
S.B., Harvard College, 1945. (1957-)

Beckwith, Marion C., *Director and Professor of Physical Education for Women*
A.B., Oberlin College, 1935; M.Ed., University of New Hampshire, 1937. (1935-)

Belford, Harriet F., *Instructor in Physical Education for Women*
B.S., University of New Hampshire, 1954. (1961-)

Belford, Robert E., *Major, Assistant Professor of Military Science*
B.S., University of New Hampshire, 1950. (1959-)

Bell, R. Virginia, *Instructor in Occupational Therapy*
B.S., University of Michigan, 1953; Certificate O.T.R., Boston School of Occupational Therapy, 1955. (1958-)

Berger, Stanley I., *Assistant Professor of Psychology*
B.A., Brooklyn College, 1950; M.A., Kansas University, 1955; Ph.D., *ibid.*, 1957. (1959-)

Bergeron, John A., *Assistant Professor of Economics*
B.A., Merrimack College, 1954; Ph.D., Massachusetts Institute of Technology, 1959. (1960-)

Bingham, Sylvester H., *Professor of English*
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Edwards, John C., *Director of Theater and Associate Professor of Speech and Drama*
B.S., Northwestern University, 1950; M.A., *ibid.*, 1952; Ph.D., *ibid.*, 1961. (1961-)

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Cert. in M.E., Lowell Institute, 1938. (1954-)

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B.S.E.E., North Dakota State College, 1947; M.S.E.E., University of Washington, 1948; Ph.D., Purdue University, 1956. (1959-)

Fasanelli, James A., *Assistant Professor of The Arts*
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Fenton, Paul J., *Agricultural Agent, Merrimack County*
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B.A., Dartmouth College, 1933; M.A., Syracause University, 1948; Ed.D., *ibid.*, 1956. (1956-)

George, Ernest A., *Associate County Agricultural Agent, Hillsborough County*
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Gilmore, Robert C., *Associate Professor of History*
A.B., University of Vermont, 1944; M.A., McGill University, 1947; M.A., Yale University, 1951; Ph.D., *ibid.*, 1954. (1952-)

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Goodrich, Robert E., *Assistant County Agricultural Agent, Rockingham County*
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B.S.E.E., University of New Hampshire, 1957; M.S.E.E., Purdue University, 1958. (1959-)

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Perito Mercantil, Escuela Profesional de Comercio, 1959; Profesor Mercantil, *ibid.*, 1961. (1961-)

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HALL, JAMES W., *Assistant County Agricultural Agent, Coos County*
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Lavine, Irvin, *Professor of Chemical Engineering*
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Long, David F., *Professor of History*
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Lothrop, William W., *Counselor and Lecturer in Psychology*
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B.S., New Hampshire College, 1921; M.A., Columbia University, 1939. (1928-)

Lundholm, Donald A., *Major, Assistant Professor of Air Science*
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Manton, Robert W., *Professor of Music*
Harvard University, 1918. (1923-)

Marshall, Thomas O., *Professor of Education*
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Marston, Philip M., *Professor of History*
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Rochester Institute of Technology, 1948. (1948-)

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O'Connell, Elias M., *Instructor in Mechanical Engineering*
Graduate, Wentworth Institute, course in forging, hardening and tempering, 1923; Graduate, two-year course in pattern making, *ibid.*, 1925. (1925-)

O'Donnell, Dorothy C., *Extension Associate Professor of Home Economics*
B.S., Cornell University, 1946;M.S., in Agricultural Journalism, University of Wisconsin, 1952; M.S., in Related Art, *ibid.*, 1955. (1961-)

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Owen, Margaret, *Order Librarian*
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Owens, Robert H., *Associate Professor of Mathematics*
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Perkins, Harold E., *Assistant Professor of Mathematics*
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Perry, Errol C., *Assistant Professor of Farm Management, Thompson School of Agriculture*
B.S., Massachusetts State College, 1920. (1929-42, 1946-)

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Pilar, Frank L., *Assistant Professor of Chemistry*
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Potter, Alfred R., *Instructor in The Arts*
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B.S., Utah State Agricultural College, 1932; Ph.D., Cornell University, 1938. (1941-)

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Richardson, Edythe T., *Professor of Zoology*
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Richardson, John C., *Associate Professor of English*
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Richter, Maurice N., Jr., *Assistant Professor of Sociology*
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Robertson, Malcolm B., *First Lieutenant, Assistant Professor of Air Science*
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Romoser, George K., *Assistant Professor of Government*
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Rosen, Sam, *Associate Professor of Business and Economics*
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Ross, Shepley L., *Associate Professor of Mathematics*
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Sargent, John E., *Forester, Coos County*
B.S., University of New Hampshire, 1959. (1960-)

Sargent, Leslie B., Jr., *Forester, Grafton County*
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Sawyer, Albert K., *Assistant Professor of Chemistry*
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Sawyer, Philip J., *Associate Professor of Zoology*
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†Schreiber, Richard W., *Assistant Professor of Botany*
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Diploma Ingenieur, Technical University, Karlsruhe, Germany, 1924; Doctor Ingenieur, *ibid.*, 1928. (1941-)

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Skelton, Russell R., *Professor of Civil Engineering*
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B.S., University of New Hampshire, 1938; M.S., Pennsylvania State College, 1940; Ph.D., Pennsylvania State University, 1953. (1950-)

†Slanetz, Lawrence W., *Professor of Bacteriology*
B.S., Connecticut State College, 1929; Ph.D., Yale University, 1932. (1932-)

Sloan, Roger P., *Forester, Rockingham County*
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B.S., University of New Hampshire, 1948; M.S., Pennsylvania State College, 1951. (1948-)

†Smith, Samuel C., *Assistant Professor of Poultry Science*
B.S., Pennsylvania State University, 1955; M.S., *ibid.*, 1958; Ph.D., *ibid.*, 1961. (1961-)

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Solt, Marvin R., *Professor of Mathematics*
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Stabler, Joseph P., *Lieutenant Colonel, Professor of Military Science*
B.S., U. S. Military Academy, 1943; M.A., University of Virginia, 1949; Graduate, Command and General Staff College, 1958. (1960-)

Standish, Priscilla, *Assistant County Club Agent, Strafford County*
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Staugaard, Burton C., *Instructor in Zoology*
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Stearns, Josephine S., *Assistant County Club Agent, Hillsborough County*
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Steele, Donald E., *Professor of Music*
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B.S., New Hampshire College, 1917; M.F., Yale University, 1926; Ph.D., *ibid.*, 1930. (1919-)

Stevens, Robert A., *Assistant State Club Leader, Cooperative Extension Service*
B.S., University of New Hampshire, 1937. (1955-)

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Stolworthy, E. Howard, *Professor of Mechanical Engineering*
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Valentine, Russell L., *Associate Professor of Mechanical Engineering*
Certificate in Machine Design, Wentworth Institute, 1942; B.S., Michigan State College, 1951; M.S.M.E., Purdue University, 1953. (1953-)

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B.A., University of Buffalo, 1949; A.M.L.S., University of Michigan, 1952; A.M., *ibid.*, 1957. (1962-)

†Wallace, Oliver P., *Associate Professor of Forestry*
B.S., University of New Hampshire, 1937; B.S.F., University of Michigan, 1938; M.F., *ibid.*, 1947; Ph.D., *ibid.*, 1954. (1953-)

Wallace, William H., *Associate Professor of Geography*
B.S., Beloit College, 1948; M.S., University of Wisconsin, 1950; Ph.D., *ibid.*, 1956. (1957-)

Walsh, John S., *Professor of Languages*
A.B., Harvard University, 1915; M.A., University of New Hampshire, 1928. (1922-)

WANG, TUNG-MING, *Assistant Professor of Civil Engineering*
B.S.C.E., National Chiao-Tung University, 1945; M.S.C.E., University of Missouri, 1954; Ph.D., Northwestern University, 1960. (1961-)

WARREN, RICHARD, *Professor of Poultry Science*
B.S., Cornell University, 1934; M.S., *ibid.*, 1935. (1937-)

WEBBER, LAURANCE E., *Research Professor and Associate Director, Engineering Experiment Station*
B.S., University of New Hampshire, 1934; M.E., *ibid.*, 1940; M.S., *ibid.*, 1946. (1937-)

WEBSTER, KARL S., *Assistant Professor of Mechanical Engineering*
B.S., University of Vermont, 1949; M.S., Pennsylvania State University, 1958. (1958-)

WEBSTER, ROBERT G., *Professor of English*
B.A., University of New Hampshire, 1926; M.A., *ibid.*, 1930. (1927-)

WEEKS, SILAS B., *Associate Professor of Agricultural Economics*
B.S., Cornell University, 1937. (1954-)

WESTON, RUTH C., *Associate State Club Leader, Cooperative Extension Service*
B.A., New Hampshire College, 1921; M.Ed., University of Maryland, 1953. (1929-)

WHEELER, CHARLES M., JR., *Associate Professor of Chemistry*
B.S., West Virginia University, 1947; M.S., *ibid.*, 1949; Ph.D., *ibid.*, 1951. (1950-)

WHITLOCK, JOHN B., *Associate Professor of Music*
B.Ed., Southern Illinois Normal University, 1937; M. A., State University of Iowa, 1941; Ph.D., *ibid.*, 1958. (1958-)

WICKS, JOHN D., *Assistant Professor of Music*
A.B., Harvard University, 1944; A.M., *ibid.*, 1947; Ph.D., *ibid.*, 1959. (1956-)

WILLIAMS, THOMAS A., JR., *Assistant Professor of English*
B.A., University of New Hampshire, 1950; M.A., *ibid.*, 1958. (1958-)

WILLIAMSON, PHYLLIS D., *Instructor in Speech*
B.A., Louisiana State University, 1945; M.A., *ibid.*, 1953. (1957-)

WILLS, DOROTHY S., *Assistant Professor of Home Economics*
B.Sc., Drexel Institute of Technology, 1953; M.Sc., *ibid.*, 1955. (1958-)

WILSON, JOHN A., *Instructor in Mechanical Engineering*
B.S. in M.E., Tufts University, 1958; M.S. in M.E., Northeastern University, 1960. (1960-)

WINGERSKY, BARY G., *Research Associate in Mathematics*
A.B., Tufts University, 1942. (1960-)

WINN, ALDEN L., *Professor of Electrical Engineering*
B.S., University of New Hampshire, 1937; S.M., Massachusetts Institute of Technology, 1948. (1948-)

WITT, WARREN W., *Lieutenant Colonel, Assistant Professor of Military Science*
B.S., Oklahoma Agricultural and Mechanical College, 1947. (1959-)

WOODRUFF, RUTH J., *Professor of Business and Economics*
A.B., Bryn Mawr, 1919; A.M., *ibid.*, 1920; Ph.D., Radcliffe College, 1931. (1931-)

Wooster, Caroline S., *Associate Professor of Physical Education for Women*
Sargent School for Physical Education, 1926; B.S., University of New Hampshire, 1934. (1944-)

†Wright, Paul A., *Associate Professor of Zoology*
S.B., Bates College, 1941; A.M., Harvard University, 1942; Ph.D., *ibid.*, 1944. (1958-)

Zei, John J., Jr., *Instructor in Music*
B.M., Lawrence Conservatory, 1953; M.M., University of Michigan, 1959. (1959-)

Zervas, Nicholas P., *Honorary Fellow in Poultry Science*
B.Sc., Agricultural College of Athens, 1950; M.Sc., Cornell University, 1954; Ph.D., Agricultural College of Athens, 1959. (1960-)

Zimmerman, Oswald T., *Professor of Chemical Engineering*
B.S.E., University of Michigan, 1929; M.S.E., *ibid.*, 1931; Ph.D., *ibid.*, 1934. (1938-)

Zoller, J. Harold, *Professor of Civil Engineering*
B.S.C.E., University of Wyoming, 1941; B.S.E.E., University of Illinois, 1945; Ph.D., University of Wisconsin, 1953. (1958-)

Zweizig, Douglas L., *Instructor in English*
B.A., Lafayette College, 1960; M.A., Harvard University, 1961. (1961-)

Methods of Admission

University admissions policy is designed to provide for the admission of those students whose background, achievement, aptitude, and motivation demonstrate that they have the qualifications for doing college work.

The University admits in-state residents who have a scholastic record which ranks them in the upper two-fifths of their graduating class, are recommended and/or certified, and have an appropriate college preparatory background. The number of out-of-state students admitted each year is limited and selection is made primarily on the basis of superior academic achievement in secondary school. Such traits as character, leadership, and initiative are taken into account.

All candidates for admission to the University are required to submit the results of the College Entrance Examination Board Scholastic Aptitude Test taken during the senior year. The December, January, or February series are preferred. The writing sample will be required for all applicants beginning in 1963-64.

All applicants living in New Hampshire are required to submit a notarized form containing a statement to the effect that their parents are legally domiciled in the state. Students admitted from states other than New Hampshire or from foreign countries are considered as non-residents throughout their entire attendance at the University unless the parents have gained bona fide residence in New Hampshire.

While 16 units of college preparatory work are strongly recommended, the University will accept 12, including at least four of English, one of natural science, and one of social science. The following minimal specific subject requirements represent the least acceptable, rather than the most desirable college preparatory program:

	Agriculture	*Liberal Arts*	*Technology*
English	4 units	4 units	4 units
Language		2 units of a single foreign language	
Mathematics	2 units	2 units	3½ units, including algebra, plane geometry, and trigonometry
Science	1 unit	1 unit	2 units (chemistry and physics)
Social Studies	1 unit	1 unit	1 unit
College Preparatory Electives	4 units	2 units	1½ units

The University participates in the Regional Cooperation Program of the New England Board of Higher Education in which students from other New England states are given priority in certain curricula, as well as special tuition consideration. Information may be obtained from the New England Board of Higher Education, 31 Church Street, Winchester, Mass., or from the admissions offices of the various New England state universities.

University Fees and Expenses

The cost for the freshman year at the University averages about $1,250 for a resident of New Hampshire and $1,700 for a non-resident.

Tuition is $380 ($800 for non-residents).* Any student registering for eight credits or more per semester pays the full tuition. Any student registering for fewer than eight credits pays $17.50 per credit hour.

Tuition for each semester is payable in advance. Three-fourths will be refunded to a student withdrawing during the first four days of a semester; one-half after four days and within thirty; and none thereafter.

Refundable deposits may be required to cover locker keys or loss or breakage in certain departments. A charge will be made for individual lessons in music, as noted in the description of Applied Music courses. A charge will be made for riding lessons, as noted in the section on Physical Education for Women and Animal Science.

Board is $360. Freshmen are required to board at the Commons Dining Hall. There are cafeterias in the Commons and in the Memorial Union for upperclassmen.

Books cost about $75. These and classroom supplies may be purchased at the University Bookstore.

There is a Memorial Union assessment of $12 and an activity tax of $10 which includes a subscription to the undergraduate newspaper and yearbook, and membership in Student Union, Student Government, and class activities.

Personal expenses average $200. These will vary with the needs of the individual student, and include clothing, laundry, recreation, incidentals, and travel.

Room rents average $230. The University has nine residence halls for women and seven for men. Undergraduate women are required to live in a residence hall or sorority house unless they live at home. Undergraduate men are not required to live in residence halls, but will be accommodated to the extent of the space available. Room rents vary from $165 to $280.

Students living in University residence halls are required to sign room contracts covering the entire year beginning in September and ending in June. Housing applications will be sent to the student at the time of official admittance to the University. Room assignments will not be made until a later date, usually in July and August. A ten dollar ($10.00) room deposit must accompany each application for a room. This deposit will be forfeited if the applicant fails to pay room rent by a stipulated date or cancels after that date. Upon occupancy the deposit is held as a damage deposit.

Room rent is payable in advance. For those attending the first semester, one-half of the year's rent must be paid not later than August 15. Rent for those attending the second semester must be paid not later than the last business day before the start of classes. The room reservation or assignment will be cancelled if rent is not paid by the stipulated due date. No follow-up notice will be sent.

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* As part of the regional cooperation program of the New England Board of Higher Education, many non-residents from certain states will be eligible for tuition at the in-state rate in selected curricula. The student must apply to the Registrar for this reduced tuition.

Rooms paid for and not occupied one day after registration day may be declared vacant and three-fourths of the room rent returned, unless the individual having the reservation makes a written request to the Manager of University Housing to hold the room until a later date. No room will be held for longer than 10 days after registration date.

An undergraduate woman student under 23 years of age is required to room in one of the women's residence halls or a sorority house, unless she is working for a room in a private home or living with her family.

The University reserves the right to adjust charges for such items as tuition, board, and room rent from time to time. Such changes will be held to a minimum and will be announced as far in advance as feasible.

A deposit of $15 is required of each student to whom military equipment is issued. Every student participating in the program of Physical Education and Athletics for Men and Physical Education for Women is required to pay $1 for locker and towel service.

Financial Aid

A financial aids program assists able and promising students who are unable to meet their educational expenses entirely from their own or their family's resources.

Tuition Grants and Scholarships

A resident of New Hampshire is eligible for consideration for a tuition grant. The amount varies from $100 to full tuition, and the basic consideration is financial need. There are scholarships available for both resident and non-resident students. The basis of these awards may be either scholastic attainment, meeting particular requirements as outlined by the donor, participation in extra-curricular activities, or other. No awards are made until a student has been admitted to the University, has submitted an application for a grant or scholarship, and his parents have filed a parents' confidential statement with the College Scholarship Service at Princeton, New Jersey.

In-state students may secure applications for grants or scholarships as well as the parents' confidential statement from high school principals or guidance counselors. Out-of-state and transfer students may secure applications for grants or scholarships from the Financial Aids Office, UNH, and the parents' confidential statement from high school principals or guidance counselors.

Loans

There are two loan funds administered by the University: the UNH Loan Fund and the National Defense Student Loan Fund. Financial need must be clearly demonstrated and loans may be used for expenses incurred in pursuing a college education. Applications for loans may be secured from the Financial Aids Office, UNH.

Employment

Various types of employment are usually available to students wishing to work part time. However, freshmen and transfer students are not encouraged to work during their first semester.

For additional information, contact the Financial Aids Office.

College of Agriculture

Harry A. Keener, *Dean*

M. C. Richards, *Associate Dean*

Departments

Agricultural Economics
Agricultural Education
Agricultural Engineering
Agronomy
Animal Science
Biochemistry
Botany
Dairy Science
Entomology
Forestry
Home Economics
Horticulture
Poultry Science

GENERAL INFORMATION

The objectives of the College of Agriculture are to give the student a fundamental education in the biological, physical, and social sciences and to provide specific technical training according to student interest in agriculture, agricultural engineering, forestry, or home economics.

Agriculture is much broader than the production of food and fiber. It includes, in addition to production, the processing, distributing, and marketing of agricultural products. These operations involve more than one-third of the total labor force in the United States and provide a wide range of career opportunities for adequately prepared college graduates. Governmental agencies, both advisory and regulatory, offer other career opportunities for graduates of agricultural colleges.

Many graduates of the College of Agriculture continue their education by studying for advanced degrees in order to prepare for the specialized positions available in teaching, research, extension, and industry. The program of study for a student who plans to enter graduate school should differ from that of a student who intends to accept a position immediately after completing the bachelor's degree. The college will help the student with his choice of a career and prepare him for competence and leadership in that career.

The College of Agriculture offers the following degrees: Bachelor of Science in Agriculture, Bachelor of Science in Agricultural Engineering, Bachelor of Science in Forestry, and Bachelor of Science in Home Economics.

Upon entering the College of Agriculture a student will declare what degree he or she seeks. In each of these degree programs the following curricula are available:

1. Bachelor of Science in Agriculture
   - Agricultural Business and Marketing
   - Agricultural Science
   - Agricultural Technology
2. Bachelor of Science in Agricultural Engineering
   - Agricultural Enginering
3. Bachelor of Science in Forestry
   - Forestry
   - Forest Game Management

4. Bachelor of Science in Home Economics
   General Home Economics
   Clothing and Textiles
   Foods, Nutrition, and Institutional Administration
   Home Economics Education

The student may select his curriculum and area of specialization upon entering as a freshman or he may wait until registration for the sophomore year. If he does not make his decision upon entering the University, the Associate Dean of the College of Agriculture will act as his adviser during the freshman year. Upon choosing a curriculum the student will be assigned an adviser, a faculty member from the department most directly concerned. Should the student elect to change his curriculum or area of specialization a new adviser may be assigned.

Specialized programs of study, such as pre-theological and two-year pre-veterinary, can be arranged for students who desire them.

For the degree of Bachelor of Science in Agriculture, Forestry, or Home Economics, each candidate must complete 136 semester credits; for the degree of Bachelor of Science in Agricultural Engineering, each candidate must complete 144 semester credits.

BACHELOR OF SCIENCE IN AGRICULTURE

The following curricula are available for students seeking a Bachelor of Science degree in Agriculture:

Agricultural Business and Marketing

The Agricultural Business and Marketing curriculum provides for those interested in the business management and economic aspect of the agricultural industry. The general program is designed to provide basic training in specific areas of interest supplemented by training in business management and the economic aspects of agriculture. Recent trends toward larger agricultural organizations have created a demand for agricultural graduates trained in business and marketing.

Opportunities for employment in a variety of professions are available, including the business management of processing plants, sales agencies, in agricultural cooperatives, analysis and forecasting of prices for agricultural commodities, or employment in federal and state agencies.

Because of the wide range of opportunities, study programs for individual students will vary considerably. The student will be advised in both the area of his interest and the business and economic aspect of his program.

Agricultural Science

The Agricultural Science curriculum is intended for the student interested in obtaining a strong background in the biological, physical, or social sciences. Such a background is highly desirable for the research scientist who is assuming an increasingly vital role in world agriculture. It is equally desirable for the teacher who is able to translate research information into terms intelligible to the production specialist.

Career opportunities for agricultural scientists are many and varied. State and federal agencies, universities, and industries increasingly are sponsoring both basic and applied research. Educational institutions have a growing need for teachers trained in science.

Careers in research and teaching generally require graduate degrees. The agricultural science curriculum permits an area of specialization and insures the wide background in the basic sciences which is indispensable for graduate study.

Agricultural Technology

The Agricultural Technology curriculum is designed for the student desiring a comprehensive modern training in the production aspects of his particular area of specialization or a combination of related areas. Since the production phase of agriculture today involves large-scale organizations, some even with foreign operations, preparation for work in this area requires broad, general training with specialization in one or two areas.

This curriculum provides a good background in the biological and physical sciences and also in the humanities and social sciences. It is sufficiently flexible to permit choice of courses in agricultural credit and business, education, and foreign languages.

Many excellent opportunities are available in a variety of industries for students prepared under the agricultural technology curriculum. Included are such positions as farm managers, county 4-H and agricultural extension agents, production specialists, and vocational agricultural instructors. Positions are also available in management, research, selling, and service work in commercial organizations, and with state and federal agencies in grading, inspection, and regulatory work.

GENERAL REQUIREMENTS

The student will elect one of the following three curricula: Agricultural Business and Marketing, Agricultural Science, or Agricultural Technology. He will also choose an area of specialization from the following:

Agricultural Economics
Agricultural Education
Agronomy
Animal Science
Biochemistry
Botany
Dairy Science
Entomology
Horticulture
Mechanized Agriculture
Poultry Science
Pre-Veterinary Medicine

In order to qualify for a degree each candidate must accumulate 136 semester credits, including credits for courses prescribed by his adviser. He must also achieve a grade point average of at least 2.

A recommendation is required for graduation from the adviser for each student.

SPECIFIC REQUIREMENTS

During the freshman year nearly all students who are candidates for the degree of Bachelor of Science in Agriculture will pursue the same general outline of course work as listed below:

	First Semester Credits	*Second Semester Credits*
R.O.T.C. — *Reserve Officers Training Corps*	0 or 2	0 or 3
P.E. — M or W — *Physical Education*	½ or 1	½ or 1
Agr. 1 — *Introduction to College*	1	
Bot. 1 — *General Botany*	4	
Chem. 1, 2 or 3, 4 — *General Chemistry*	4	4
Elective courses	3–5	5–6
English 1, 2 — *Freshman English*	3	3
Zool. 48 — *Principles of Zoology*		3
	17	17

In addition, students must take the following course work: Sophomore R.O.T.C., men only (3 or 4 credits), Economics 1 (3 credits), Physics (4 credits), English and/or Speech (5 credits), Mathematics (6 credits).*

ADDITIONAL REQUIREMENTS

In order to complete the requirements for the Bachelor of Science degree in Agriculture, a student must obtain, in addition to the specific requirements, credits in the following groups:

Group A — Arts, English, Humanities, Language, Music, Philosophy, Speech

Group B — Botany, Entomology, Microbiology, Zoology

Group C — Biochemistry, Chemistry, Mathematics, Physics, Statistics

Group D — Economics or Agricultural Economics, Education, Government, History, Psychology, Sociology

Group E — Courses in the College of Agriculture

Group F — Courses which adviser considers necessary for specialized study in area of specialization

Group G — Elective courses which the student considers appropriate to meet his educational objectives

The group requirements for each curriculum are as follows:

Agricultural Business and Marketing

Group A — 6 credits

Group C — 3 credits

Group D — 9 credits selected from at least 3 of the subject areas listed; Also 9 credits in Economics 2 and Business Administration 1, 2

* It is assumed that many students will select mathematics as an elective during the freshman year.

Group E — 9 credits selected from at least 3 subject areas other than his area of specialization

Group F — 30 credits

Group G — 23 credits*
47 credits specific requirements

136 credits

Agricultural Science

Group A — 9 credits

Group B — 6 credits

Group C — 9 credits selected from at least 2 of the subject areas listed

Group D — 9 credits selected from at least 2 of the subject areas listed

Group E — 3 credits in a subject area other than his area of specialization

Group F — 30 credits

Group G — 23 credits*
47 credits specific requirements

136 credits

Agricultural Technology

Group A — 6 credits

Group B — 3 credits

Group C — 6 credits selected from at least 2 of the subjects listed

Group D — 9 credits selected from at least 3 of the subjects listed

Group E — 12 credits selected from at least 3 subject areas other than his area of specialization

Group F — 30 credits

Group G — 23 credits*
47 credits specific requirements

136 credits

The above curricula offer a student considerable flexibility depending upon his interest and objectives.

AREAS OF SPECIALIZATION

Agricultural Economics
Agricultural Education
Agronomy
Animal Science
Biochemistry
Botany
Dairy Science
Entomology
Horticulture
Mechanized Agriculture
Poultry Science
Pre-Veterinary

* Depending upon the specific courses chosen by the student in groups A through E, there may remain somewhat fewer than 23 credits in Group G.

Agricultural Economics

The student in Agricultural Economics learns primarily the science of economics and the application of economics to farm management, food marketing, agricultural price policy, use and conservation of natural resources, world food supply, and growth in underdeveloped countries. In addition, students majoring in this field will obtain a sound background in scientific farming from courses in agricultural production. The student is also encouraged to take courses contributing to a broad university education.

Course work in Agricultural Economics can be arranged under either of the three curricula for the degree of Bachelor of Science in Agriculture:

1. *Agricultural Business and Marketing:* The agricultural producer is being served by an expanding group of marketing and service firms requiring agricultural college graduates with economics and business training. In Agricultural Economics the program emphasizes marketing and market development, agricultural business management,, consumer economics, price analysis, and farmer cooperation, with supplementary courses in accounting.
2. *Agricultural Science:* This curriculum is designed for students interested in college teaching, scientific research, and careers in specialized fields requiring strong backgrounds in the economics of agriculture. Some of the specialized fields are foreign service in underdeveloped countries, market development and price analysis, agricultural banking, and resource conservation. Emphasis is placed upon the basic concepts and theories of economics and their application to agriculture and marketing. This curriculum also will be advantageous for the student planning to pursue graduate study.
3. *Agricultural Technology:* Students in this curriculum who choose Agricultural Economics as their special area of interest will be preparing for careers associated with the broad economics aspects of agricultural production and marketing. This program of study will prepare the student as a farm owner or manager. In addition he will be qualified to fill numerous available positions with such organizations as the agricultural extension service, banks, farmers' cooperatives, market regulating organizations, and firms selling farm supplies or farm products. The student will take specific courses in production economics, marketing, agricultural policy, farm credit, and agricultural cooperatives.

The courses in Agricultural Economics are complementary with those offered by other departments in the College and are in part designed to help major students in other fields gain knowledge about economics related to agriculture.

Agricultural Education

Under the provision of the Smith-Hughes Act, the University of New Hampshire has been designated as the institution in the state for the preparation of teachers of agriculture. Vocational Agriculture offers a fertile field for young men who desire to follow the profession of teaching. The work is varied and interesting with opportunities for wide community contacts through the all-day, young farmer, and adult-farmer programs.

Agricultural teachers are encouraged to enter upon a program of graduate study as a means of professional growth. Successful completion of such study should result in greater opportunities for advancement in the field of agricultural education.

Due to the nature of the duties performed by the teacher of agriculture, it is essential for a student to acquire a good foundation in the predominating agricultural enterprises of the state. His course of study, therefore, will follow a broad general program rather than a specialization in any one particular field. Furthermore, he must meet the state requirements for certification which include one semester of practice teaching, 14 additional credits of courses in Education, and 8 credits in Agricultural Engineering. In addition, the teacher must have farm upbringing prior to enrolling in Vocational Agriculture Teacher Training or two years of agricultural experience, one year of which must have been continuous in a standard commercial farm enterprise.

Agronomy

Students specializing in Agronomy obtain a basic knowledge of the physical and biological sciences in addition to learning the fundamental principles in soils, field crops, plant breeding, and plant genetics. Basic training in the soil and crop sciences is essential to most segments of agriculture.

Those students who specialize in soils may find employment in soil conservation, soil classification and mapping, soil fertility, soil physics, soil chemistry, soil microbiology, and many other fields requiring a knowledge of the soil. Those who specialize in crops will be qualified for employment in crop production, plant breeding, turf management, weed control, crop introduction, and in related fields.

Persons trained in Agronomy are qualified to take Federal Civil Service examinations to enter field crops, soil science, or soil conservation positions in the United States Department of Agriculture. Positions in research and teaching are also available to those with advanced training at the graduate level. The agricultural extension services, as well as seed, feed, and fertilizer companies, employ graduates who have training in Agronomy.

Well-equipped laboratories and greenhouse facilities are provided for students. Opportunities are available to study nearby field experiments.

Animal Science

Animal Science is offered to students who wish training in the selection, breeding, feeding, fitting, showing, training, and management of light horses, beef cattle, sheep, and swine. It provides basic knowledge for all livestock enterprises and related fields, including conservation and the packing and feed industries.

Many graduates enter the field of extension work as county agents and livestock specialists. The subject matter is fundamental for advanced study in Animal Science. Some who have completed this curriculum are executives, managers, veterinarians, college teachers, breed representatives, packer buyers, feed salesmen, and farm operators.

Students are assigned advisers in the Animal Science Department. The adviser will discuss the areas of the individual's special interest and recommend a choice of Agricultural Science, Agricultural Business and Marketing, or Agricultural Technology as a guide in course selection.

Meat and meat products are included in this curriculum. Cultural subjects are required. Students interested in certain classes of livestock may have opportunities to specialize.

The department maintains Morgan horses for all phases of class work including riding. Selected students may be permitted to take young horses to their homes in the summer for continued training. Herds of Milking Shorthorn, Hereford, and Aberdeen Angus cattle, Yorkshire swine, and a flock of Dorset sheep are maintained.

Biochemistry

Students choosing Biochemistry as their area of specialization will elect the Agricultural Science curriculum. They will receive training in the various branches of general chemistry and in the application of chemistry to the growth and development of plants and animals. The methods used in biochemical analysis and in the study of nutrition and metabolism are given special attention.

The curriculum is designed to provide a thorough foundation for students preparing for graduate study and eventual teaching or research, or for technical positions in universities, experiment stations, research institutes, and industrial organizations related to the life sciences. A student who wishes to major in this department should take Chemistry 3-4, and Mathematics, in his freshman year.

As this is a professional and specialized field, entrance to it, and continuance in it, are conditioned by a satisfactory record. An early conference with the chairman of the department is imperative.

Botany

Students interested in a broad background in the plant sciences should consider majoring in Botany. Such students will generally choose the Agricultural Science curriculum.

The principal areas of concentration in Botany are: (1) Plant Pathology — the study of plant diseases, their causes and control; (2) Physiology — the study of plant functioning with such practical applications as plant nutrition and requirements for plant growth; (3) Taxonomy — plant classification and plant identification; (4) Ecology — the relationship of the plant to its environment; (5) Morphology and Anatomy — The study of the anatomy, development, and cellular organization of plants, including histological techniques; (6) Cytology — the cell, cytological techniques, and chromosome studies; (7) Preparation for botanical technicians; and (8) Preparation for secondary-school teaching.

The undergraduate courses to be taken in all these fields are nearly the same until the junior and senior years. Some specialization should then be made. The student who graduates in Botany may take graduate work in Botany or in the related fields of Horticulture, Forestry, and Agronomy which require an extensive background in Botany. Assistantships, research positions, and full-time teaching jobs are more available at present than in previous years. Opportunities for able botanists also occur in government work. Positions as technicians or secondary-school teachers may be obtained with a B.A. or B.S. degree.

Dairy Science

Dairy Science courses are designed to provide fundamental scientific training in dairy production and dairy technology.

Outstanding graduates from both of these areas are qualified to pursue advanced study in preparation for college teaching, research, and specialized technical positions in industry, agricultural experiment stations, and federal and state agencies.

Dairy production courses include breeding, nutrition, and management of dairy cattle. They offer preparation for the various agricultural industries and services related to dairy farm operations, such as technical positions in the food industry, the dairy equipment industry, and breed and breeding organizations; positions in public service with state and federal agencies; and dairy farm management.

Training in dairy technology prepares students for administrative and plant and laboratory positions in dairy processing plants, and for inspectors of dairy products and dairy establishments in federal, state, and municipal service.

The University dairy herd, together with the operations in the market milk, pasteurizing, and ice cream units at the Dairy Building, contribute to the practical training of students in any one of several lines of the dairy industry.

The Dairy Science laboratories are located in the Dairy Building, in the Ritzman Animal Nutrition Laboratory, and in the Dairy Barn. Facilities in the area of dairy production include the University dairy herd, consisting of purebred Ayrshire, Guernsey, Holstein, and Jersey animals. This herd has received national recognition and honors.

Equipment in the Ritzman Animal Nutrition Laboratory includes a bomb calorimeter, metabolism stalls for digestion studies, respiration chambers for heat production measurements, and other facilities used in nutrition research with both farm and laboratory animals. Facilities for dairy technology, located in the Dairy Building, include pasteurizers, coolers, ice cream freezer, bottler, refrigeration units, homogenizer, and a soaker type bottle washer. The milk testing and bacteriological laboratories are equipped for chemical and bacteriological analyses of dairy products.

Entomology

Entomology offers courses for students who wish to specialize in the study of insect life, insect control, apiculture, and insects in relation to man. There are many fields open to those qualifield in Entomology. There are opportunities for employment in public institutions and organizations, and in addition, there are many opportunities for employment with commercial and industrial firms.

Students who desire a broad fundamental training in Entomology and related fields will follow the program outlined as General Entomology in the Agricultural Technology curriculum. Those who wish to specialize in chemical control of insects, and who plan to take graduate work leading to a professional degree in that field, will follow a program outlined as Insect Toxicology in the Agricultural Science curriculum. These students will be expected to take considerable mathematics and chemistry.

Students planning a career in Entomology should consult with their adviser in regard to the selection of electives best suited to their needs.

Horticulture

Conditions of climate, soil, and market combine to make New Hampshire a state with great horticultural possibilities. The Department of Horticulture offers instruction in three major fields: Pomology (fruit growing, including small fruits), Vegetable Crops, and Ornamental Horticulture, with particular emphasis on propagation and greenhouse management.

Students who graduate in Horticulture will have received the liberal training expected of a university graduate, a thorough preparation in the fundamental sciences underlying plant production and plant breeding, adequate training in general horticulture, and, finally some specialization in the field chosen. The particular courses suggested by the adviser will be determined by the curriculum chosen by the student, i.e., Agricultural Business, and Marketing, Agricultural Science, or Agricultural Technology.

The courses offered acquaint the student with the problems and methods of the improvement, production, and marketing of fruit, vegetables, plants, or flowers. The training is such that superior students can pass the Federal Civil Service examinations required for entrance into positions with the

United States Department of Agriculture. It is usually expected that students will take graduate work if they intend to make their professional career in research, teaching, or extension at the state or federal level. University of New Hampshire graduates with a good scholastic record have had no difficulty in securing fellowships or scholarships in other colleges and universities for graduate training.

When a student desires, a special effort is made to provide opportunity for practical experience during vacation periods so that upon graduation he has more than a theoretical knowledge of his profession. The extensive University orchards, gardens, and greenhouses are used as laboratories.

Mechanized Agriculture

Specialization in the area of Mechanized Agriculture is offered by the Department of Agricultural Engineering. This major is designed to provide instruction and training in the fundamentals of agricultural science with particular emphasis on the technical phases of farm operation. The program of study prepares men for self-employment as farm operators and for commercial positions in the agricultural industry.

Mechanized Agriculture majors may find employment selling or servicing agricultural building materials, labor-saving mechanical equipment, irrigation systems, tractor, and field machinery. Graduates are qualified for positions as agricultural extension workers, as soil conservationists with the Soil Conservation Service, or as "rural use advisers" with electric utility companies. They may also find employment with farm insurance companies or agricultural management organizations.

As farming becomes more intensive and the mechanization of our farms more complete, there will be even greater opportunities for men with this type of training.

Poultry Science

Poultry Science courses offer students fundamental and special training in the practical and professional fields of poultry. The poultry industry is one of the fastest growing agricultural industries and it offers excellent opportunities for trained personnel in all its phases.

The program of study prepares students for various lines of work, such as production, sales and service with feed and equipment manufacturing concerns, marketing organizations handling poultry and eggs, extension work, commercial hatcheries, geneticists with breeding organizations, nutritionists with feed concerns, market analysts with industrial concerns. poultry farm managers, as well as for the operation of the individual's own farm. By supplementing undergraduate work with one or more years of graduate study, properly qualified students will find excellent opportunities in the professional fields of teaching, extension, and research, and in commercial fields.

Major students will find a variety of courses offered in the Department. A student interested in Poultry Science should take a selected group of these courses with the others optional, depending upon his interests.

A qualified staff member of the Department assists the student in planning his course of study so as to give consideration to the interest and abilities of each student.

The student selecting Poultry Science as his area of specialization can obtain a well balanced program in any one of the three curricula; Agricultural Business and Marketing, Agricultural Science, or Agricultural Technology.

The Department works closely with the New Hampshire poultry industry which ranks high in the country. In this connection, frequent trips are made

to leading farms and industrial concerns and full discussion is given in the classroom to broad and pertinent problems of the industry.

All the facilities of the University Poultry Farm and the research laboratories are available for instruction purposes.

Pre-Veterinary

Students who contemplate veterinary medicine as a career should elect the Agricultural Science Curriculum. During the freshman year the pre-veterinary student will choose the curriculum outlined for all agricultural freshman, excepting that Chemistry 3 and 4 will be taken instead of Chemistry 1 and 2.

Because of the fact that the veterinary colleges of the country vary somewhat in their pre-veterinry requirements, it is necessary for each student to confer with his adviser relative to course work requirements of the sophomore year.

Although two years of pre-veterinary college work will meet the requirements of most schools of veterinary medicine, it is not to be regarded as a foregone conclusion that completion of such work will guarantee admission. All veterinary colleges give first preference for admission to applicants from their respective states. The few out-of-state students who will be admitted must show above average scholastic ability.

It is desirable that applicants to colleges of veterinary medicine have farm experience and, in fact, it is a prerequisite for admission to some.

BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING

The purpose of this curriculum is to train men in the application of engineering knowledge and techniques to the problems of the agricultural industry. A sound academic background in the natural sciences and mathematics and the fundamentals of engineering and agriculture precede specialization in Agricultural Engineering. Most agricultural engineers are employed in the fields of farm structures, farm machinery, electric power, crop processing, and soil and water conservation. The student has an opportunity to select courses which are of interest to him and are related to these major phases of the profession.

Students who complete this course of study are qualifield for engineering service in rural communities; for teaching, research, and extension work in colleges, experiment stations, and government agencies; for positions related to the design, manufacture, and sale of farm machinery and farm power equipment; for advisory and managerial posts in connection with agricultural development; for positions with farm buildings and materials concerns; and for work relating to the use of electricity in agriculture. Opportunities for employment and progressive advancement after graduation are numerous in this expanding field of engineering.

Each candidate for a degree in Agricultural Engineering must complete at least 144 semester credits of the courses required in the four-year curriculum described below.

Freshman Year	First Semester Credits	Second Semester Credits
P. E. 31-32	½	½
R.O.T.C.	0–2	0–3
Chem. 3-4. *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
*Math. 21-22, *Calculus B1 and B2*, or Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Social Humanistic Elective	3	
	18	19

Sophomore Year		
R.O.T.C.	2–3	0–2
Econ. 1, *Principles of Economics*	3	
Agron. 11, *Introductory Soils*	4	
C. E. (7), *Surveying*		3
†Math. 23-24, *Calculus B3 and Differential Equations*, or Math. 27-24, *Multi-dimensional Calculus* and *Differential Equations*	5	3
M. E. 25, *Statics*	2	
M. E. 26, *Dynamics*		3
Phys. 23-24, *General Physics II, III*	4	4
Social Humanistic Elective		3
	19½	17½

Junior Year		
Ag. Econ. 14, *Farm Management*		4
Ag. Eng. 32, *Farm Tractors*		3
Ag. Eng. 33, *Field Machinery*	3	
E. E. 39, *Electrical Engineering Fundamentals*	4	
M. E. 33, *Thermodynamics*	3	
M. E. 35, *Strength of Materials*	3	
Agricultural Electives	3	3
Technical Electives	3	9
	19	19

Senior Year		
Ag. Eng. 31, *Soil and Water Engineering*	3	
Ag. Eng. 34, *Agricultural Structures*		3
Ag. Eng. 35, *Electric Power and Processing*	3	
Ag. Eng. (61), *Special Problems in Agricultural Engineering*		3
C. E. 52, *Fluid Mechanics*		3
Engl. 23, *Writing of Technical Reports*	2	
Technical Electives	9	9
	17	18

* Sequence will be assigned on the basis of mathematics entrance examination.

† Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

BACHELOR OF SCIENCE IN FORESTRY

Forestry majors are educated in professional responsibility and for employment as foresters in public and private organizations in all forest regions of the United States. All students will have completed the same foundation in the basic sciences in addition to a group of required Forestry courses upon receiving the degree of Bachelor of Science in Forestry. The curriculum is designed to prepare men for the work required of foresters. from the growing of raw material to its utilization by forest industries. The responsibilities and skills of the profession also include the management of non-agricultural lands for watershed, wildlife, and recreational values. The Department of Forestry is accredited by the Society of American Foresters.

The courses in the Forestry curriculum are required and intended to assure the student a sound professional base. Beyond this the student and his forestry adviser develop a program of study on an elective basis, not only from courses available in the Forestry Department but throughout the University, dependent upon the individual's needs and professional goals. Immediately following the junior year, all forestry students attend an eight weeks' summer camp in the White Mountains. The student also gains the advantages of field instruction on 575 acres of woodlands adjacent to the University campus under management of the Forestry Department. The student forester is expected to complete one or more summers of successful employment in forestry during his undergraduate years. Close liaison is maintained between the employing agencies and the Department on the work progress of the student.

The Department has developed a specialized program over the years for those who specifically wish to fit the themselves for employment in wildlife management. These men are required to complete the same basic program as other Forestry students. This combination is considered essential, as a large part of the country's wildlife program of the future will be handled by men employed primarily as foresters.

GRADUATION REQUIREMENTS

Candidates for the Bachelor of Science degree in Forestry must complete 136 semester credits, including the departmental course requirements and the following college requirements: freshman and sophomore R.O.T.C. courses; Physical Education 31, 32; Agriculture 1; Botany 1; Chemistry 1, 2, or 3, 4; English 1, 2; Zoology 48; Biological Sciences (3 credits) in Botany, Entomology, Microbiology, or Zoology; Biochemistry or Chemistry (5 credits); Economics 1 (3 credits); Agricultural Economics, Economics, or Forestry 44 (3 credits); English and/or Speech (5 credits); Mathematics (3 credits); Physics (4 credits); Social Sciences (6 credits) in Government, Humanities, Psychology, Sociology, or Education 41, 57.

FORESTRY

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31-32	½	½
R.O.T.C.	0–2	0–3
Agr. 1, *Introduction to College*	1	
Bot. 1, 6, *General Botany, Systematic Botany*	4	3
Chem. 1, 2, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
For. 25, *Dendrology*	2	
Mathematics		3
Zool. 48, *Principles of Zoology*		3
	16	18
Sophomore Year		
R.O.T.C.	2–3	0–2
Agron. 11, *Introductory Soils*	4	
Bio. Ch. 1, *Organic and Biological Chemistry*	5	
C. E. (7), *Surveying*		3
Econ. (1), *Principles of Economics*		3
Ent. 46, *Forest Entomology*		3
For. 27, *Silvics*	3	
For. 28, *Applied Statistics*		3
Mathematics	3	
Sp. (15), *Public Speaking*		3
Electives		3
	17–18	18
Junior Year		
Bot. 56, *Plant Physiology*		4
Engl. (23), *Writing of Technical Reports*		2
For. 29, *Silviculture*	3	
For. 43, 44, *Forest Mensuration; Forest Economics*	4	3
Physics 9, *Elementary Physics*	4	
Social Science	3	3
Electives	4	6
	18	18
Summer Session		
For. 42, *Forest Engineering*	4	
For. 45, *Timber Survey*	6	
	10	
Senior Year		
For. 51, 66, *Forest Utilization; Wood Identification*	4	3
For. 59, (69), *Forest Protection; Forest Management*	3	4
Electives	5	13
	12	17

FOREST GAME MANAGEMENT

Freshman Year

Same as for Forestry

Sophomore Year	*First Semester Credits*	*Second Semester Credits*
R.O.T.C.	2–3	0–2
Bio. Ch. 1, *Organic and Biological Chemistry*	5	
C. E. (7), *Surveying*		3
Econ. (1), *Principles of Economics*		3
Ent. 46, *Forest Entomology*		3
For. 27, *Silvics*	3	
For. 28, *Applied Statistics*		3
Mathematics	3	
Zool. 7, 8, *General Zoology; Comparative Anatomy*	5	5
	18–19	17–19
Junior Year		
Bot. 56, *Plant Physiology*		4
Engl. (23), *Writing of Technical Reports*		2
For. 29, 34, *Silviculture; Forest Fish and Game*	3	3
For. 43, 44, *Forest Mensuration; Forest Economics*	4	3
Phys. 9, *Elementary Physics*	4	
Zool. 77, 78, *Natural History and Taxonomy of the Vertebrates*	5	5
	16	17
Summer Session		
For. 41, *Wildlife Field Studies*	10	
Senior Year		
Agron. 11, *Introductory Soils*	4	
For. 51, 66, *Forest Utilization; Wood Identification*	4	3
For. 59, (69), *Forest Protection; Forest Management*	3	4
For. 55, 56, *Forest Game Management*	4	4
Social Science	3	3
Sp. (15), *Public Speaking*		3
	18	17

BACHELOR OF SCIENCE IN HOME ECONOMICS

There are four majors offered in Home Economics, all leading to a Bachelor of Science degree in Home Economics:

1. GENERAL HOME ECONOMICS. By a careful selection of elective courses, students are prepared for one of several positions. They may be employed in home service departments of gas and electric companies, in department stores, nursery schools, welfare agencies, as food editors with newspapers, in radio, in television, and with the Cooperative Extension Service.

2. CLOTHING AND TEXTILES. Graduates are successfully employed in positions of responsibility in the field of fashion; in merchandising, retailing, and promotional work with pattern companies and manufacturers. Interior design and fashion illustration are careers for the student with a talent in art. Additional graduate education leads to teaching or research in college or work as a clothing specialist with the Cooperative Extension Service.

3. FOODS, NUTRITION, AND INSTITUTIONAL ADMINISTRATION. In this major there are many career choices for those who qualify: as hospital dietitians, in college and industrial food services, in school lunch programs, with food and equipment companies, with newspapers, radio, television, advertising agencies, or with public and private health services. With additional preparation the home economist does research in foods and nutrition in industry, with the government, or in universities.

4. HOME ECONOMICS EDUCATION. Home economists teach in elementary and high schools and are employed by the Cooperative Extension Service. Students, after having teaching experience and graduate study find positions in the specialized fields of adult education, college teaching, or administration.

A student selecting any one of the above is required to meet the specific and additional minimum requirements of the College of Agriculture, as follows:

SPECIFIC COLLEGE REQUIREMENTS

Except for Physical Education these requirements would usually be completed during the freshman year.

Agriculture 1
Botany 1, Zoology 48, or Biology 1-2
Chemistry 1, 2 or 3, 4
English 1-2
Physical Education 1, 2, 3, 4

ADDITIONAL COLLEGE REQUIREMENTS

These requirements are ordinarily completed during the sophomore, junior, or senior years.

Biological Sciences (Botany, Zoology, Entomology 2, Microbiology)	3
Chemistry (Biochemistry or Chemistry)	5
Economics 1	3
Economics or Agricultural Economics	3
English and/or Speech	5
Social Sciences (Government, History, Psychology, Sociology, Education 41, 57)	6

GENERAL HOME ECONOMICS

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P.E.-W 1, 2	1	1
Agr. 1, *Introduction to College*	1	
Arts 23, *Elementary Drawing and Design*	2	
Chem. 1-2, *General Chemistry*	4	4
English 1-2, *Freshman English*	3	3
H. E. 4, *Textiles*		3
H. E. 5, *Principles of Clothing Construction and Design*	3	
H. E. (18), *Principles of Food Selection and Preparation*	3	
Electives		
	17	17
Sophomore Year		
P.E.-W 3, 4	1	1
Ag. Econ. 34, *Economics of Consumption, or Econ. 2, Principles of Economics*		3
Bot. 1, *General Botany*	4	
Econ. 1, *Principles of Economics*	3	
English and/or Speech Elective	3	
H. E. (19), *Menu Planning and Service*		3
H. E. 25, *Child Development*	3	
Zool. 48, *Principles of Zoology*		3
*Electives	3	7
	17	17
Junior Year		
Ag. Eng. 2, *Residence Planning*		2
Bio. Chem. 1, *Organic and Biological Chemistry*	5	
Biol. Science Elective		3
H. E. 32, *Interior Decoration*		3
H. E. 87, *Home Management*	3	
Social Science Elective	3	3
*Electives	6	6
	17	17
Senior Year		
English and/or Speech Elective	3	
H. E. 83, *Family Development*	3	
H. E. 88, *Home Management Residence*		3
*Electives	11	14
	17	17

*Electives will be selected from courses recommended by the adviser to meet the objectives of the individual student's program. These will include six additional credits in the departments of humanities, languages, philosophy or social sciences.

CLOTHING AND TEXTILES

Freshman Year	First Semester Credits	Second Semester Credits
P.E.-W 1, 2	1	1
Agr. 1, *Introduction to College*	1	
Arts 23-24, *Elementary Drawing and Design*	2	2
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshmen English*	3	3
H. E. 4, *Textiles*		3
H. E. 5, *Clothing Construction*	3	
*Electives	3	4
	17	17
Sophomore Year		
P.E.-W 3, 4	1	1
Bot. 1, *General Botany*	4	
Chem. (45), *Organic Chemistry*		5
Clothing Elective		3
Econ. 1, *Principles of Economics*	3	
Econ. 2, *Principles of Economics*		3
H. E. 32, *Interior Decoration*		3
Microb. 1, *General Microbiology*	4	
Zool. 48, *Principles of Zoology*		3
Soc. Sci. Elective	3	
Math. Elective	3	
	18	18
Junior Year		
B. A. 46, *Principles of Retailing*		3
Clothing Elective	3	
Econ. 25, *Marketing*	3	
English and/or Speech Elective	2	
History Elective		3
Physics 9	4	
*Electives	5	11
	17	17
Senior Year		
Clothing Elective		3
H. E. 65, *History of Costume*	3	
H. E. 69, *Advanced Textiles*	3	
English and/or Speech Elective	3	
Social Science Elective		3
*Electives	8	11
	17	17

*Additional suggested electives for those interested in the following areas:

Costume Design
Arts 5, 6, 8, 28, 88; Home Economics 48.

Interior Decoration
Agr. Eng. 2; Arts 6, 8, 28, 88; Home Economics 48, 87, 88; Horticulture 27, 37.

Merchandising
Arts 28; Business Administration 45, 47, 68; Economics 51; Home Economics 48, 67; Psychology 32.

Textile Research
Arts 6, 8; Chemistry 17, Home Economics 48; Psychology 32.

FOODS, NUTRITION, AND INSTITUTIONAL ADMINISTRATION

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P.E.-W 1, 2	1	1
Agr. 1, *Introduction to College*	1	
Arts. 23, *Elementary Drawing and Design*	2	
Biol. 1-2, *Man and the Living World*	3	3
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshmen English*	3	3
H. E. (18), *Principles of Food Selection and Preparation*	3	
H. E. (19), *Menu Planning and Service*		3
Electives		3
	17	17
Sophomore Year		
P.E.-W 3, 4	1	1
Ag. Econ. 34, *Economics of Consumption or Econ. 2, Principles of Economics*		3
Chem. 45, *Organic Chemistry*	5	
Econ. 1, *Principles of Economics*	3	
H. E. 21-22, *Quantity Foods and Purchasing*	3	3
Math. Elective	3	
Phys. (9), *Elementary Physics*		4
Psych. or Soc. Elective		3
Sp. 15, *Public Speaking*	3	
Electives		3
	18	17
Junior Year		
Bio. Ch. 56, *Physiological Chemistry*		5
Chem. 17, *Introductory Quantitative Analysis*	4	
English and/or Speech Elective		3
H. E. 73, *Nutrition*	3	
Microb. 1, *General Microbiology*	4	
Soc. or Psych. Elective		3
Electives	6	6
	17	17
H. E. 48, *Field Work—Summer*	2-6	
Senior Year		
H. E. 71, *Experimental Foods*	3	
Electives	14	17
	17	17

Additional suggested electives to be selected under advisement for fulfilling American Dietetic Association requirements in Food Service Management, Education, or Experimental Foods:

Biochemistry: 51-52
Chemistry: 21(21)-22
Economics and Business Administration: B. A. 1-2; B. A. 7-8
Education: 41 (41), 57 (57)
English: 23 (23)
Home Economics: 46, 53, 55, 74, 75, 76, 84, 86, 93, 98
Psychology: 32, 47, 53
Sociology: 2, 27, 33, 44, 45, 57, 58, 59
Zoology: 17, 18, 61, 62

HOME ECONOMICS EDUCATION

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P.E.-W 1, 2	1	1
Agr. 1, *Introduction to College*	1	
Arts 23, *Elementary Drawing and Design*	2	
Chem. 1-2, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
H. E. 4, *Textiles*		3
H. E. 5, *Clothing Construction*	3	
H. E. (18), *Principles of Food Selection and Preparation*	3	
Electives		6
	17	17
Sophomore Year		
P.E.-W 3, 4	1	1
Ag. Eng. 2, *Residence Planning*		2
Bot. 1, *General Botany*	4	
Clothing Elective	3	
English and/or Speech Elective	3	
H. E. (19), *Menu Planning and Service*		3
H. E. 25-26, *Child Development*	3	3
Sp. 15, *Public Speaking*	3	
Zool. 48, *Principles of Zoology*		3
Electives		6
	17	18
Junior Year		
Ag. Econ. 34, *Economics of Consumption* or Econ. 2, *Principles of Economics*		3
Bio. Ch. 1, *Organic and Biological Chemistry*	5	
Bio. Ch. 6, *Chemistry of Food and Nutrition*		3
Econ. 1, *Principles of Economics*	3	
Ed. 57, *Educational Psychology*	3	
Ed. 58, *Principles of Teaching*		3
H. E. 32, *Interior Decoration*		3
H. E. 87, *Home Management*	3	
Microb. 5, *Public Health and Sanitation*	3	
Electives		3
	17	15

SENIOR YEAR

Ed. 59, *Principles of American Secondary Education*	3	
H. E. 73, *Nutrition*	3	
H. E. 83, *Family Development*	3	
H. E. 84, *Personal, Family, and Community Health*		2
H. E. 88, *Home Management Residence*		3
H. E. 91, *Methods in Home Economics Education*	3	
H. E. 94, *Supervised Teaching in Home Economics*		7
H. E. 96, *Seminar in Home Economics Education*		3
H. E. 98, *Preparation and Evaluation of Illustrative Materials*		2
Soc. 33, *Cultural Anthropology*	3	
Electives	3	
	18	17

For specific prerequisites of courses in the Department of Education, refer to the footnote in the description of courses in Problems in the Teaching of High School Subjects.

TWO-YEAR NON-DEGREE CURRICULUM

The Thompson School of Agriculture offers several technical curricula to men and women who are interested in preparing for careers in the broad field of agriculture.

The College of Agriculture, University of New Hampshire, together with the Agricultural Education branches of the State and Federal Offices of Education cooperate in providing this educational program.

The Thompson School of Agriculture has a staff of well qualified instructors who are selected on the basis of teaching ability, experience, and an understanding of the problems of young people preparing for a vocation in agriculture. In addition to the Thompson School staff, the entire staff of the College of Agriculture is available for consultation and for any other assistance which its members may be able to give. Each student is encouraged to confer with anyone on the University staff who may be of possible help.

In the development of the various curricula offered by the Thompson School of Agriculture, careful attention has been given to the fundamental aspects of both the practical and scientific phases of the students' educational program.

These curricula are designed particularly for those who wish to prepare for technical careers in agricultural production, conservation, manufacturing, processing, distribution, and marketing.

Positions Open to Graduates

Graduates of the Thompson School of Agriculture have received a thorough technical education, therefore, they are in a favorable position to secure employment on the technical level in an agricultural field of their choice.

Those students who have demonstrated solid academic achievement and desirable personality traits quite frequently have a rather wide choice of positions. Some outstanding possibilities for employment are as follows: Agricultural Production — farm operators, managers, estate superintendents, florists, landscape gardeners, nurserymen. Conservation — soil conservation aids, forestry aids, forest technicians, fire control aids, engineering aids, county office managers, technicians, fish and game conservation officers.

Agricultural Manufacturing — managers, foremen, and technicians in grain mills, fertilizer plants, agricultural chemical plants, farm equipment plants, and dairy equipment plants. Agricultural Processing — managers, foremen, and technicians in milk plants, packing plants, poultry dressing plants, and fruit and vegetable processing plants. Agricultural Distribution — owners, managers, salesman, fieldmen, sales managers, and buyers for large and small business concerns wholesale and retail engaged in the distribution of agricultural products. Marketing — meat, poultry, and dairy inspectors, advertising, market reporters. Miscellaneous — bank agricultural representatives, artificial insemination technicians, research technicians, dairy herd improvement and breed association testers, farm realtor insurance agents, agricultural news, radio, and television commentators.

Many graduates are now successful operators of farms, greenhouses, and landscaping businesses in New Hampshire and other states. Others are employed as farm managers, herdsmen, greenhouse managers, plant growers, and estate superintendents. An increasing number are being employed in many different capacities by agricultural cooperatives, feed, fertilizer, chemical and equipment companies scattered throughout New England, the Northeast, and other sections of the country.

Admission Requirements

The Thompson School of Agriculture is open to both men and women. Graduates of high schools will be admitted irrespective of age. Applicants who are not high school graduates must be 18 years of age and must have had at least two years of high school work or its equivalent. The applicant is not required to submit specific high school courses as prerequisites for admission. However, courses in Mathematics, Biology, and Chemistry have proven to be of real value in preparation for future course work in the plant and animal sciences. It is recommended that each prospective applicant take the College Board Scholastic Aptitude Test during his senior year in high school.

Requirements for Graduation

The completion of the program requires two calendar years. The instruction is divided as follows: the student obtains two semesters of classroom and laboratory work on campus followed by a summer of supervised Agricultural Placement each year. However, it is possible for a student to attend the Thompson School of Agriculture for only two or more semesters, plus Agricultural Placement, and acquire considerable valuable information and first-hand knowledge of farming. Upon satisfactory completion of four semesters on campus with a minimum of 63 semester credits plus two summers of Agricultural Placement in the order described, the student will be awarded a certificate of graduation.

The Agricultural Placement will be adapted to the personal needs and interests of the individual. This work may be conducted on the home farm, on some good commercial farm known to the student, or in some related agricultural occupation in which the student plans to engage. All placement situations selected by the student, through his own initiative, must be approved by the school staff. Every effort will be made to find suitable placement positions for students who are unable to locate such positions for themselves.

This practical training, required during each summer, will be under the direct guidance and supervision of the teaching staff. Certain records and reports are required of the student while on placement, and no student will be granted a certificate until such records and reports are complete.

Major Fields of Instruction

There are six major fields of instruction: General Agriculture, Agri-Business, Animal Science, Horticulture, Forest Technology, and Soil and Water Conservation Technology. The student will select the one he wishes to pursue and may elect courses in other fields in order to provide for a well-balanced program.

Facilities for Instruction

Facilities of the University including the University farm, dairy herd, milk plant, poultry plant, horticulture farm, livestock department, greenhouses, and laboratories, are available for instructional purposes.

Financial Aid

The purpose of the financial aid program is to assist able and promising students who are unable to meet their educational expenses from their own or their family's resources. This may be done in one of the following ways or in a combination of two or more. *Deferred Payments.* Students who cannot pay their University bills in full may request permission to pay on the deferred payment plan. The initial payment which is due prior to registration, shall be not less than ⅓ of the total amount of the University bills. The balance is paid in 2 equal installments in the following two months. *Employment.* Various types of employment, on and off the campus, are usually available. *Tuition Grants.* A resident of New Hampshire is eligible for consideration for a tuition grant. The amount varies from $100 to full tuition. The award is based on financial need. *Loans.* The University of New Hampshire has a loan program which makes limited amounts available to students in need of this kind of assistance. No interest is charged until graduation or separation from the University.

Additional information and applications may be secured from the Financial Aids Office, Room 108, Thompson Hall.

Additional Information

Persons who are interested in the Thompson School of Agriculture should request a catalogue from the Thomson School of Agriculture, Putnam Hall, University of New Hampshire, Durham, N. H.

The College of Liberal Arts

David C. Knapp, *Dean*

Melville Nielson, *Assistant Dean*

Departments and School

The Arts
Education
English
Foreign Languages and Literatures
Geology and Geography
Government
History
Hotel Administration
Microbiology
Music
Philosophy
Psychology
Sociology
Speech and Drama
Whittemore School of Business and Economics
Zoology

The departments of Chemistry, Mathematics, and Physics in the College of Technology and the departments of Botany and Entomology in the College of Agriculture offer major programs for students in the College of Liberal Arts.

PURPOSE AND OBJECTIVES

It is the purpose of the College of Liberal Arts, as a center of learning and scholarship, to help all of its members achieve an understanding of the heritage of civilization and to educate them in the tradition of the past and the realities of the present so that they may recognize and act upon their obligations to the future.

The College endeavors to meet the educational needs of each student through the development of interests and skills which, combined with the student's potential, makes possible the living of a richer and more useful life.

ORGANIZATION

The development of common interests and the coordination of educational efforts in behalf of students in the College are promoted by divisions as follows: Biological Sciences, Humanities, Physical Sciences, Social Sciences, and Teacher Education. The personnel of each division includes all Faculty members assigned to the College, and to departments of other colleges which are authorized to offer major programs or prescribed curricula in the College of Liberal Arts.

The *Humanities Division* is composed of the staffs of the departments of The Arts, English, Foreign Languages and Literatures, Music, Philosophy, and Speech and Drama. The *Social Sciences Division* is composed of the staffs of the Whittemore School of Business and Economics, and the departments of Government, History, Hotel Administration, Psychology, and Sociology. The *Physical Sciences Division* is composed of the staffs of the departments of Geology and Geography, and the departments of Chemistry, Mathematics, and Physics in the College of Technology. The *Biological Sciences Division* is composed of the staffs of the departments of Microbiology and Zoology, and the departments of Botany and Entomology in the College of Agriculture. The *Division of Teacher Education* consists of

the members of the instructional staff of the University who are teaching professional courses in Education. These include courses in the problems of teaching the subjects offered in the public schools and the courses in Physical Education, in The Arts, and in Music that are designed to prepare teachers.

The offerings of the College of Liberal Arts consist of two groups: the *General Liberal Arts* curriculum and the *Prescribed* curricula. Teacher Preparation curricula are also provided.

GENERAL LIBERAL ARTS CURRICULUM

The General Liberal Arts curriculum is intended primarily to provide a broad, liberal program and general education leading to the Bachelor of degree.

A student enrolled in the General Liberal Arts curriculum will major in some subject or field of knowledge. Some of these major programs offer, at least in part, direct professional training.

The objectives, opportunities, and requirements of majors in the General Liberal Arts curriculum are described in the paragraphs which follow. It is possible also for students in the General Liberal Arts curriculum to arrange programs of study in addition to those described below, although such students will be held strictly to the University and College requirements of the General Liberal Arts curriculum. *Students interested in arranging special programs of study should consult the Assistant Dean of the College.*

The Arts

The Department of The Arts offers two professional programs, Art Education and Occupational Therapy. A major in The Arts is open to students in the General Liberal Arts program who wish to concentrate in the visual arts. Many courses in the department are open to students in other major programs. Included are courses in history, design, drawing and painting, graphic arts, photography, advertising design, illustration, sculpture, ceramics, weaving, metal work and jewelry, wood-working and plastics, drafting, etc. A continuing series of exhibitions are shown in the University Galleries. An experimental arts laboratory (The Student Workshop) is operated in Hewitt Hall. All courses in the department and the Student Workshop program are designed to develop intelligent enjoyment and a critical understanding of the arts, and to provide facilities for creative expression.

Several types of programs may be arranged to meet the individual needs of students majoring in The Arts. For example, one may concentrate in design and painting, or in the crafts, or one may elect a program which provides opportunities in a combination of areas. The final program is worked out in consultation with the adviser at the time of declaring one's major.

Students majoring in areas in which an understanding of the arts may be desirable, such as business, education, hotel administration, home economics, etc., are invited to consider taking one or several courses in the department.

Students majoring in The Arts are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They must also earn 24 semester credits, with grades of C or better, in courses in The Arts. The following courses are required for The Arts major: Arts 23, *Basic Design* (does not carry major credit); Arts 31, 32, *Introduction to The Arts.* Courses in speech and drama, literature, music, and home economics may

be approved as related work for a major in The Arts with the consent of the supervisor. The courses of each major program are selected to meet the needs of the student, as determined in conference by the student and his supervisor. An assigned major work and/or a paper in the student's area of specialization will be required in the senior year.

Students interested in majoring in *The Arts* are advised to consult with the supervisor, Professor John W. Hatch.

Biology

Students who are interested in a broad background in the life sciences are advised to major in Biology. Such students will be required to take courses in botany, entomology, microbiology, and zoology in building up a program. The field, however, is so inclusive that the majority of students will find it desirable to include one or two additional courses in one of the sub-divisions, such as Botany, Microbiology, or Zoology. In addition to students who desire to study Biology for general education, it is suggested that those who are interested in *Applied Biology* and *Secondary-School Teacher Preparation* register as Biology majors. Students who are interested in Forest Game Management are advised to consider registration in the curriculum of that name offered by the Department of Forestry in the College of Agriculture.

Teacher Preparation — Students who are planning to teach Biology in secondary schools are urged to plan for practice teaching during the senior year. As few positions are available in any year for teaching Biology alone, a student should include courses in his program of study which will qualify him for teaching other sciences.

Applied Biology — Students preparing for positions which involve the application of the science of Biology, such as those frequently listed by the federal civil service, the state governments, and industry, should follow the general program of Biology majors and should elect one or two additional courses in fields of Applied Biology. The Division is well fitted to assist in the preparation of students for work in fish and game research, conservation education, and in state departments of conservation. Students preparing for professions in this group should plan to secure advanced degrees, since positions in these fields are difficult to secure without graduate study. Students who are interested in hospital laboratory work should consult the *Medical Technology* curriculum.

Satisfactory completion of the requirements of a Biology major will generally qualify students for admission to graduate schools to specialize in Biology or in one of its major subdivisions.

Students who major in Biology are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They are expected also to complete courses offered in the Division to a total of 24 semester credits (exclusive of Biology 1-2 or 3 and Zoology 48) with a grade of C or better. The minimum course requirements for Biology majors include Microbiology 1; Botany 3; one course selected from Botany 6, 12, 42, or 56; Entomology 2; Zoology 7; and one other course in Zoology (except Zoology 97, 98). *Biology majors are also required to complete Chemistry 3-4 and eight additional hours in physical science (Chemistry, Geology, Mathematics, Physical Science 1-2, or Physics). These courses in physical science cannot be offered as major credit.*

Students interested in majoring in *Biology* are advised to consult with the supervisor, Professor Paul A. Wright.

Botany

Students who are interested in plant life are advised to consider registration as majors in Botany. Botany majors with suitable undergraduate backgrounds may enter the field of secondary education or become research technicians. Botany majors, other than those whose interest is secondary-school teaching, research technique, or a general education, should expect to continue in graduate study here or elsewhere. Government work, institutional research, certain types of industrial positions, and college teaching are open to Botany students with advanced preparation. The principal fields of concentration in Botany are: (1) Pathology, (2) Physiology, (3) Taxonomy, (4) Ecology, (5) Morphology and Anatomy, (6) Cytology.

Students who major in Botany are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They must also complete courses offered by the Department, to a total of 24 semester credits with grades of C or better. Courses in other departments closely related to the major courses may be counted with the consent of the major supervisor. A broad background in chemistry and other biological sciences is considered essential for most major students.

The courses of each major program are selected to meet the needs of the individual student, as determined by the student and his supervisor in personal conference.

Students interested in majoring in *Botany* are advised to consult with the supervisor, Professor Albion R. Hodgdon.

Chemistry

Students who are interested in the study of Chemistry will find opportunities in such fields as individual work involving the development of processes or production activities or sales work based on a scientific knowledge of the marketable products, the teaching of Chemistry and allied subjects in secondary schools or of Chemistry in colleges, and graduate study for those students who are interested and particularly proficient in their undergraduate work.

The University offers two channels for study of Chemistry: majoring in the subject in the College of Liberal Arts, or enrolling in the Prescribed curriculum in *Chemistry* in the College of Technology. In the College of Liberal Arts a major should complete Chemistry 3-4, *General Chemistry*, or preferably Chemistry 5-6, *Inorganic Chemistry*, certain courses in Mathematics and Physics, and in addition other courses offered by the Department in *Analytical, Organic, and Physical Chemistry* to a minimum of 24 semester credits, with grades of C or better. According to the student's interests, other supporting subjects may be elected to form a broad program of study and to prepare for one of the opportunities listed above. Majors in Chemistry are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91).

The Department is equipped to furnish the preparation necessary for teaching Chemistry in secondary schools. As very few positions are available in any year for teaching Chemistry alone, a student should consider a program of study which may qualify him for teaching Chemistry and other sciences, and should consult with the Chairman of the Department of Chemistry and Professor Everett B. Sackett of the Department of Education. Students who are interested in teaching Chemistry in college are advised to plan on graduate study.

Students who plan to major in *Chemistry* are advised to consult with the Chairman of the Department of Chemistry as early in their college program as possible.

Economics

Students who are interested in economics and business life, but do not desire to specialize intensively in the Business curriculum or the Secretarial curriculum, are advised to consider registration as majors in Economics. Students who intend to enter upon graduate study in Economics should plan to major in this field as undergraduates. An increasing number of opportunities in business and the public service are open to young people who possess graduate preparation in Economics.

Business positions in retail stores, chain stores, banks, sales organizations, general business offices, insurance, and other firms have been successfully filled by graduates of the University who have majored in Economics. The Business curriculum provides specific preparation for several of these fields by reason of its specialized requirements. A student who desires breadth in his education, with an emphasis on Economics, is counseled to major in the Department.

The Department is equipped to furnish the preparation necessary for teaching Economics in secondary schools. As very few positions are available in any year for teaching Economics alone, a student should consider a program of study which may qualify him for teaching Economics and other social studies, and should consult Professor Degler and Professor Everett B. Sackett of the Department of Education.

Students who major in Economics are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They are required to complete successfully Economics 1-2, *Principles of Economics;* and Economics 31, *Economics and Business Statistics.* They are required to complete 24 semester credits of Economics, with grades of C or better. Of these 24 semester credits, a minimum of 12 credits must be in courses in Economics numbered 51 or higher. *Major credit toward the 12 semester hours required in courses numbered above 50 will be approved in the case of transfer students only if such courses have been taken as upper division courses, i.e., in the junior or senior year.* Individual programs will be arranged to meet the needs of the individual student. *Business Administration* 1-2, 21-22, 68, and 70 may be counted for major credit in *Economics. Business Administration* 68 and 70 may be counted in partial fulfillment of the requirement that 12 semester credits be in courses numbered 51 or higher.

Students interested in a major in *Economics* should consult with the supervisor, Professor Carroll M. Degler.

Education

Students who are interested in preparing themselves for teaching are referred to the section on "Preparation for Teaching" starting on page 84.

Graduates of two- or three-year normal schools or teachers colleges, and who are teaching or supervising in elementary schools, may major in Education. They are required to complete at the University, with grades of C or better, 12 semester credits of work in elementary education selected from the advanced courses in that subject as a part of the total credits which are required of them as candidates for the degree of Bachelor of Arts. Such students will select the remainder of their major programs with the advice and approval of the Chairman of the Department of Education.

Some courses offered in Education are designed to be of interest to the general student.

Professor Everett B. Sackett is supervisor of majors in Education.

English

The Department of English offers two programs of study: the *Literature* major and the *Teaching* major.

The *Literature* major must fulfill the requirements of the General Liberal Arts curriculum (page 91). He must also complete English 13 and must earn grades of C or better in 24 semester credits in literature courses numbered above 50: of these, 6 credits must be in Shakespeare (English 57, 58); 6 credits in American literature (this requirement may be satisfied by English 15, 16, but the 6 credits thus earned cannot be counted toward the 24 major credits); and an additional 12 credits in at least three centuries of English literature prior to the twentieth.

The Teaching major must meet in full the requirements of the General Liberal Arts curriculum (page 91) and the state certification requirements for teaching. He must also take the following courses, 24 credits of which must be passed with the grade of C or better:

English 13, 14
English 16
English 85
English 86
English 87, 88, and 89
English 57 or 58
English-Education 91
Speech 28 or 62
Speech 64

Students who are interested in majoring in *English* should consult with the supervisor, Professor Sylvester H. Bingham.

Entomology

The Department of Entomology offers various courses for students who wish to specialize in the study of insect life, insect control, and insects in relation to man. There are many fields open to those qualified in Entomology. There are opportunities for employment in public institutions and organizations, and in addition, there are many opportunities for employment with commercial and industrial firms which frequently employ college graduates who have majored in this field of study. Graduate study is desirable for the student who seeks high achievement in Entomology. A more intensive program in Entomology may be secured in the Prescribed curriculum offered in the College of Agriculture.

Students who major in *Entomology* are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They are expected also to complete successfully courses offered by the Department, to a total of 24 semester credits, with grades of C or better. Courses in other departments may be counted with the consent of the major supervisor.

Outlines of specific suggested programs of study are available to the student upon request to the supervisor, Professor James G. Conklin.

Foreign Languages and Literatures

A major in Foreign Languages and Literatures may be of interest to the following groups of students:

(1) Those who wish to do college teaching in foreign languages and literatures. Graduate study is indispensable for such work, but preparation may be made for it by a certain amount of undergraduate specialization.

(2) Those who plan to teach foreign languages in secondary schools. As most high school language teachers are obliged to teach more than one language, or one language in combination with other subjects, such stu-

dents should plan to concentrate in a single language and its literature, but should map out a program including another language, or a number of courses in English, history, or the social sciences. Prospective teachers should consult the Chairman of the Department, Professor R. Alberto Casás, and Professor Everett B. Sackett, Chairman of the Department of Education.

(3) Those who intend to enter other professional fields in which a background in foreign languages and literatures is desirable. Such a field, for example, might be that of library service. Most library schools require two foreign languages.

(4) Any students who feel free to plan their college program without too specific reference to a vocation, and who have a special interest in foreign languages and literatures.

For non-majors, three courses are offered in English. These courses are, respectively, a survey of Greek and Latin Literature (in translations), a survey of Modern European Literature (in translation), and an introduction to Romance Philology.

Since most graduate schools require a knowledge of two foreign languages, *all* students who may possibly do graduate work in *any field* should obtain a reading knowledge of French and German.

Students majoring in the Department of Foreign Languages and Literatures, are expected to meet in full the requirements of the General Liberal Arts Curriculum (page 91), and must designate *French, German, Latin,* or *Spanish* as their particular major. The following courses cannot be counted for major credit: French 1, 2, 3, 4; German 1, 2; Greek 1, 2; Italian 1, 2; Latin 1, 2; Russian 1, 2; Spanish 1, 2. A major must comprise a minimum of 24 major credits, 21 of them in a particular language and its literature. The remaining 3 credits may be earned in other designated courses in the Department.

The special supervisor for majors in *French* is Professor Louis J. Hudon; for majors in *German,* Professor Alexander P. Danoff; for majors in *Latin* and *Spanish,* Professor R. Alberto Casás.

Attention is called to the combined major in *History and Literature.*

General Physical Science

A student having broad interest in physical science, but no professional objective in any one of the recognized sciences in this field, may register as a *General Physical Science* major.

Students who major in General Physical Science are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91), In addition, they must complete each of the following courses, and achieve in them an overall grade point average of 2.3 or better: Mathematics 7-8, *Fundamental Mathematics* 9-10, *Differential and Integral Calculus,* and 30, *Astronomy;* Chemistry 3-4, *General Chemistry,* and 21, *Semimicro Qualitative Analysis;* Geography 21, *The Weather,* and 22, *Climates of the World; Geology* 1-2, *Principles of Geology;* and *Physics* 1-2, *Introductory Physics.* Students who are interested in choosing *General Physical Science* as a major should consult with the superivsor, Professor Jerome M. Pollack.

Geology

The field of geology includes the earth sciences. This is not alone the study of minerals, rocks, and evidence of prehistoric life. It includes also the history of the earth from its beginning as well as the evolution of the landscape, and other environmental features which have influenced the development of life on the earth, including man.

Students who are interested in the earth sciences, both those who expect to make some phase of geology their life work, and those who desire to build a program of liberal studies around a core of geological and related subjects, are advised to register as majors in *Geology*.

The search for new sources of essential mineral resources and the development of new uses for certain minerals have emphasized the need for men trained in the earth sciences. Positions as mining geologists, petroleum geologists, mine operators, federal and state survey geologists, and university and college professors of geology and mineralogy have been successfully filled by graduates of the University who have majored in Geology. Other former major students are teaching in high schools or are in business, some in fields where their geologic preparation is useful, as in the cement and mining-machine industries.

Students who major in Geology are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They are expected also to complete Geology 1-2, *Principles of Geology*, and, in addition, courses in Geology or related courses approved by the supervisor to a total of 24 semester credits with grades of C or better. The courses of each major program are selected to meet the needs of the individual student, as determined by the student and his supervisor in personal conference.

At the end of the senior year, a student who majors in Geology must, after consultation with his supervisor, submit either a satisfactory paper or pass a written comprehensive examination.

Students who are interested in majoring in *Geology* are advised to consult with the supervisor, Professor Jerome M. Pollack. After a student's major interest is determined, the advice, assistance, and counsel of one or more additional members of the Department will be sought where a special area of concentration is contemplated by the student. For example, the student whose special interest lies in geographic or meteorologic fields will be assigned to the staff members responsible for these fields.

Government

The courses offered by the Department of Government are designed to aid the student in gaining a knowledge of the nature, functions, and problems of government, and of the place of government in the modern world. For this general purpose, courses are offered in public affairs — local, state, national, and international. Some courses listed by the Department are chiefly intended to provide information needed for intelligent and responsible citizenship and to provide a part of a liberal education. Others are of a specialized nature and have been planned to provide basic preparation for professional work. A few are intended to stress the historical and philosophical development of the growth of political thought and institutions.

By specializing in one of several programs of Government, the major student may prepare himself for graduate study in political science and government, public administration, research in government, the study of law, graduate study for the foreign service, or teaching government courses in secondary schools. Students who are preparing to teach government courses in the secondary schools should check their planned program of study with Professor Everett B. Sackett of the Department of Education. Ordinarily, prospective teachers of government courses will find it necessary to teach related courses in the social sciences.

Majors in *Government* have an unusual opportunity for mastering research techniques and gaining practical information concerning state and

local government in New Hampshire through work as an intern in an approved public or private agency. For this program the student should enroll in Social Science 81, *Internship,* with the prior permission of the Chairman of the Department of Government. Further opportunity for similar research may be gained in Government 65.

Majors in *Government* are expected to meet all requirements of the General Liberal Arts curriculum (page 91). All major students are required to take Government 5, *Elements of Political Science,* and Government 6, *Principles of American Government.* Students who expect to major in *Government* are advised to register for these courses during the freshman or sophomore year. Students majoring in Government are also required to complete a research paper approved by the staff. This project constitutes the chief part of *Research in Government Problems,* Government 65. A major consists of a minimum of 24 semester credits of work with grades of C or better in Government and in any related courses which may be appproved by the supervisor. The 24 semester credits should include not less than 12 in courses above 50. Not more than 9 credits earned as an intern in Social Science 81 may be counted toward the completion of the major requirements. Each student will be counseled individually and his program of study planned for his needs.

Students interested in electing *Government* as a major should meet with the supervisor, Professor John T. Holden.

History

History, as a field in which to major, may be of interest to the following groups of students: (1) Those who wish to do college teaching in history. Graduate study is indispensable for such work, but preparation may be made for it by a certain amount of undergraduate specialization. (2) Those who plan to teach history in secondary schools. For such a position, training in other social studies is highly desirable, if not absolutely necessary. The student is therefore advised to keep in touch with the Department of Education, as well as with the Department of History, with a view to satisfying teaching certification standards and building a well-rounded program of studies. (3) Those who intend to enter other professional fields in which a considerable amount of historical knowledge is desirable. Such a field, for example, might be that of library training in which an historical preparation would rank with study in literature as a background, or the increasingly important profession of archivist. (4) Any students who feel free to plan the college program without too specific reference to a vocation, and who have a special interest in history.

Students who major in *History* are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They must earn 24 semester credits in courses in History, with grades of C or better, exclusive of History 1,2, which must include a minimum of six semester credits from *Group A* and a minimum of six semester credits from *Group B.* (See the description of courses offered by the Department.) A student who majors in History must prepare a satisfactory paper in his field of concentration or take a comprehensive examination. If the student writes the paper, he must secure approval of the subject chosen from the Chairman of the Department before December 15 of the student's senior year and the completed paper must be filed with the Chairman before April 15 of the year in which the degree is to be granted. The examination will be given on a prearranged day before April 15.

Students planning to major in History should consult with the supervisor, Professor Philip M. Marston.

History and Literature

Students who desire a broad education may take a combined major in *History and Literature*. Students who plan to enter library service may also find here a desirable major. The program of this major offers an opportunity to study the history and literature together of France, of Germany, or of Spain. A still broader survey of European history and of its literature is also possible. The program involves the completion of 24 semester credits with grades of C or better in one of the following groups of courses, of which 12 credits should be in History and 12 credits in Languages:

I History 9, 10, 19, 20, 83, 84;
Spanish 5, 6, 51, 52, 55, 56, 65, 66;

II History 19, 20, 83, 84;
French 5, 6, 41, 59, 60, 64, 67, 69, 70, 81, 82;

III History 19, 20, 83, 84;
German 5, 6, 53-54, 55-56, 57-58;

A student who has met the major requirements in *History and Literature* and other requirements of the General Liberal Arts curriculum (page 91) will be recommended for the Degree of Bachelor of Arts with the notation "History and Literature" on the Commencement progarm.

Students' registration cards may be signed by either Professor Philip M. Marston, Chairman of the Department of History, or Professor R. Alberto Casas, Chairman of the Department of Foreign Languages and Literatures.

Students electing option I, II, or III will be encouraged to do a considerable part of their reading for the History courses in Spanish, French, or German, respectively.

Mathematics

Over and above the benefits to be derived from the study of mathematics for its own interest, it is being recognized, even more forcefully, that such study will give the student essential and invaluable equipment for any scientific pursuit. The courses in mathematics are intended to provide a sound preparation in the fundamentals of the subject, as well as to offer a sufficient variety of subject matter to meet diversified interests. Courses are designed to prepare the student who majors in *Mathematics* for opportunities in various fields. Among them are work in statistics, such as government agencies, business, life insurance, and the application of statistics to problems in education, economics, sociology, psychology, medicine, and genetics; teaching mathematics in secondary schools; graduate study for those students who are interested and especially proficient in their undergraduate work; many industrial opportunities requiring mathematics for research in applied problems and consulting work.

All students who major in *Mathematics* must meet in full the requirements of the General Liberal Arts curriculum (page 91), and must complete, with grades of C or better, at least 24 semester credits in Mathematics (exclusive of Math. 2, 3, 7-8, 21-22 and 25), including Math. 62 and 68.

All students who are interested in a *Mathematics* major should consult with the supervisor, Professor Donald M. Perkins.

Microbiology

Students interested in the study of bacteria and other microorganisms should register as majors in Microbiology. Such students may prepare themselves for positions in universities, experiment stations, research institutes,

industrial organizations, and in federal, state, or city laboratories. Opportunities are available in the fields of medical or public health, microbiology, animal diseases, and in sanitary, food, dairy, soil or industrial microbiology. Students may also prepare themselves for employment as sanitary inspectors or in other phases of public health work. Students primarily interested in hospital laboratory work should consult the *Medical Technology* curriculum.

Students who major in Microbiology are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They are expected also to complete courses offered by the Department, and by related departments, to a total of 24 semester credits, with grades of C or better. *A course in Organic Chemistry is also required by Microbiology majors, but cannot be counted as part of these 24 major credits.* The courses of each major program are selected to meet the needs of the individual student, as determined by the student and his supervisor in personal conference.

Students interested in majoring in *Microbiology* are advised to consult with the supervisor, Professor Lawrence W. Slanetz.

Music

The Department of Music offers a major program in the General Liberal Arts curriculum. Studies such as history, literature, and appreciation of music endow the student with cultural values which enrich his entire life. Instruction offered in the Department of Music is designed to develop musicianship, the ability to perform and capacity to teach, supplemented by the general education required by the College of Liberal Arts. The broad scope of subjects available within the Department equip the student with a basis for professional competency and at the same time provide the foundation and stimulus for graduate study.

Instrumental and vocal instruction are given in private lessons, while class instruction provides for the pursuit of academic studies. Student recitals, instrumental and vocal ensembles, Men's and Women's Glee Clubs, the University Concert Choir, Symphony Orchestra, and Symphonic Band afford both laboratory and concert experience in a variety of performance settings.

The expanding and dynamic force which music is fast becoming in contemporary American society is reflected by increasd demands for teachers of music; performers; music librarians; radio, recording, television, and movie musicians; music therapists; and higher standards of quality and performance of music in places of worship.

The Department of Music offers courses leading to the Bachelor of Science degree with a major in *Music Education* (see page 87 for curriculum requirements).

A major in *Music* is offered with three options in concentration. All students must complete the requirements of the basic theory courses: Music 9-10, 11-12, 13-14, and 15-16; and the basic history-literature course, Music 37-38. In addition, the specific requirements of each option are given below:

I. Music History: advanced theory (4 credits); advanced history and literature (12 credits); Music 23 and/or Music 26 (8 credits).

II. Applied Music: qualified students may major in voice, piano, organ, strings, woodwind or bass (a student choosing this option must pass a performance examination before the Department of Music staff); advanced theory or literature (4 credits) and applied music (16 credits — 2 credits per semester). A senior recital also must be presented.

III. Theory: emphasis on musical composition; advanced theory (12 credits), advanced history (4 credits), and Music 23 (8 credits).

Students majoring in *Music* are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They must also earn grades of C or better in all courses required of the *Music* major.

The Department of Music is a Member of the National Association of Schools of Music.

Prospective majors in *Music* are advised to consult with the supervisor, Professor Karl H. Bratton.

Philosophy

The Greeks understood philosophy as the love of wisdom, that ardent desire to know which Aristotle called the natural aspiration of all men. From this original impulse toward knowledge the sciences and the humanities developed. The goal of the special sciences is the detailed study of limited fields of inquiry. Philosophy aims at a comprehensive knowledge of the whole, a single perspective which will include things as seemingly diverse as matter, space, time, life, spirit, society, beauty, and the divine. And since wisdom is not quite the same thing as knowledge, philosophy also seeks to bring together the discoveries of the special sciences, to assess their significance, and to apply this knowledge to the conduct of life.

Courses in philosophy, taken early in a student's program of study, provide an introduction to some of the dominant themes in the history of ideas and enable the student to get a view of the forest in which he will later examine the trees. Taken near the end of his studies, such courses afford a perspective of where the student has been, how much he has left unexplored. Philosophy 5 and Philosophy 8, at the introductory level, are designed to present such an inclusive view as well as to acquaint the student with the specific nature of philosophic inquiry and with some of the fundamental philosophic problems. Courses in the intermediate group provide for more systematic inquiry in the history of philosophy and in some of the more important branches of the subject in which problems common to philosophy and other disciplines, such as art, literature, religion, and psychology, can be investigated. The advanced courses are for majors and for other students willing to acquire the necessary background for such work. In most cases, such background can be acquired by taking Philosophy 21, 22.

William James once said that, ultimately, the really important question is why there is something rather than nothing. Students who agree with James might consider a major in philosophy. Students interested in philosophy as a major should take Philosophy 21, 22 as early as possible since this course is the foundation for most of the advanced work in the department.

Students who major in philosophy must fulfill the requirements of the General Liberal Arts Curriculum (page 91). They must also earn a minimum of 24 semester credits in philosophy or related subjects with grades of C or better, including the following courses in philosophy: 3, 21, 22, 55, 56 and six hours of work in the group 89, 90, 99.

At the end of the senior year students majoring in philosophy must pass a comprehensive written-oral examination covering (1) the history of philosophy and (2) some field of systematic study (e.g., ethics, aesthetics, metaphysics) selected by the student.

Students interested in majoring in philosophy should consult with the supervisor, Professor Robert W. Jordan. (Until September, 1962, consult Professor Asher Moore).

Physics

The major in *Physics* is intended to prepare students for a diversity of interests in the application of this fundamental science. Broad in scope, the program provides electives so that a student may supplement his work in physics by that in other fields such as mathematics and the allied sciences. The intermediate courses are intended to give the student a thorough grounding in fundamentals in a particular branch of physics. Some of these courses are supplemented by appropriate laboratory work. Opportunity is given in the senior year for the major student to do some elemental investigation of his own choosing under guidance. Graduates of this major are eligible for employment in the various industrial, government, and armed services laboratories or they may continue study in the academic field leading to advanced degrees.

Students who major in *Physics* are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They are required to complete 24 semester credits, in addition to the introductory courses, with grades of C or better, and *must elect Physics 18, 23-24 as the introductory course in place of Physics 1-2.* Since proper preparation in mathematics is essential, the student should elect in the freshman year if possible, Mathematics 21-22, in order to have the prerequisites for the courses that follow. If Mathematics 7 has been passed with a grade of B or higher, students in the College of Liberal Arts may be admitted to Physics 18, 23-24 while taking Mathematics 8, 9-10 concurrently, with the specific approval of the Department of Physics, provided grades of at least B in mathematics are maintained. Liberal Arts students who wish to register for advanced courses in physics should discuss the mathematical prerequisites with the Department of Physics. Seniors are required to participate in a colloquium, Physics 97-98.

Students who wish to major in *Physics* are advised to consult with the supervisor, Professor Harry H. Hall.

Psychology

Some students may wish to major in *Psychology* for the purpose of understanding themselves and others more adequately and of gaining knowledge of scientific methods of studying human behavior. Others may not only have these aims in mind but also may wish to specialize in psychology to prepare themselves for one of the following professional objectives: college teaching; personnel work in industry or government; supervision of psychological testing in mental hospitals, juvenile courts, city school systems, child guidance clinics, and the federal civil service; counseling and guidance in secondary schools and colleges; or clinical practice.

Students who contemplate major work in psychology as a means of preparing for a profession should keep in mind the necessity of graduate work. For non-majors, a background of psychology will be an asset in teaching, nursing, social work, business and industrial management, or in professions such as medicine and law in which human relations are of primary importance.

Students who major in *Psychology* are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). They are required to complete 24 semester credits with grades of C or better in courses in psychology and in such related courses as may be approved by the supervisor. Psychology 95, *Advanced General Psychology*, and Psychology 98, *Seminar in Psychology*, are required of all majors and must be passed with a grade of C or better. Psychology 57, *Experimental Psychology*, and Psychology 67, *Statistics in Psychology*, should be taken by all psychology majors who are planning for graduate work. A comprehensive paper

on a subject approved by the supervisor is required. This paper is the core project in Psychology 98.

Students who wish to major in *Psychology* are advised to consult with the supervisor, Professor Herbert A. Carroll.

Sociology

The major in *Sociology* is for students who desire a liberal education with emphasis on study of the organization and differentiation of society, including study of the research methods developed in recent years for a better understanding of social phenomena; students who intend to do graduate work in sociology; or students who plan to attend a graduate school of social work but prefer a broader choice of undergraduate electives than the prescribed Social Service curriculum permits.

The Social Service curriculum, with its field experience and its concentration on pre-professional courses, not only prepares students to enter graduate schools of social work but also has been quite successful, for a number of years, in preparing them for junior positions in social work prior to graduate study.

Students who wish to teach sociology in secondary schools are advised that such teachers usually have to teach related social studies. Students with this vocational aim should consult with Professor Everett B. Sackett of the Department of Education.

Majors in Sociology are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91). It is recommended that they take Sociology 1, *Introductory Sociology*, during their freshman or sophomore years. In addition, they must complete a minimum of 24 semester credits with grades of C or better in Sociology (or in any related course approved by the supervisor). Sociology 85, 86, *Development of Sociological Thought*, Sociology 92, *Fields of Sociology*, and Sociology 75, 76, *Methods of Social Research*, are required. At the end of the senior year majors must pass a written comprehensive examination.

Students who are interested in choosing *Sociology* as a major should consult with the supervisor, Professor Richard Dewey.

Speech and Drama

The Department of Speech and Drama offers a major with two options: *General Speech* and *Drama*. A major in either *General Speech* or *Drama* makes an excellent focal point for those students desiring a liberal education combining course work in the humanities, literature, the arts and social sciences. The purpose of this major is to offer a broad program for students interested in: a liberal education stressing the speech arts; a pre-professional background for careers in such fields as public service, teaching, law, ministry, public relations, social administration, and personnel work; basic preparation for the teaching of speech and drama, direction of debate, drama and other speech activities in secondary schools, community theater direction, and professional training for television, theater, and speech correction.

Courses in speech and drama may also be elected for their cultural value by students pursuing other majors.

Those seeking a major in *General Speech* should acquire a good background in English language and literature, history, government, philosophy, and psychology. They should be able to speak and write well, and they should acquire a reasonable proficiency in public speaking and oral reading.

Those seeking a major in *Drama* should combine that study with a wide variety of liberal arts courses in such fields as history, dramatic literature, philosophy, the arts, music, and psychology.

The following three-credit courses are required of all Speech and Drama majors: Basic Speech (without major credit), Discussion (without major credit in General Speech), and Introduction to Theater (without major credit in Drama).

For majors in the *General Speech* option, the following three-credit courses are required: Debate, Theater and Its Drama, Rhetoric in the Western World, Stagecraft, and Speech Correction. Six credits are also required in specific courses in literature* in related departments as approved by the major adviser and not also used to satisfy Group, College, or University requirements. Individual students may be allowed to substitute Television and Radio Workshop for Stagecraft with the approval of the major adviser. Stagecraft will contribute considerable background for the course in Television and Radio Workshop.

For majors in the *Drama* option, the following three-credit courses are required: Theater and Its Drama, Stagecraft, Acting, Directing, and Scenic Design and Lighting. Six credits are also required in specific courses in dramatic literature* in related departments as approved by the major adviser and not also used to satisfy Group, College, or University requirements.

All majors will be required to write a satisfactory paper and/or satisfactorily complete a special project during their senior year. The student must secure approval of the subject of the paper and/or the special project from his major adviser before the Christmas vacation of his senior year and file the completed paper and/or project with the major adviser before the 15th of May of the year in which his degree is to be granted.

To count for major credit the courses required must be completed with a grade of C or better.

Students who wish to major in *Speech* and *Drama* should consult with the supervisor, Professor Joseph D. Batcheller.

Zoology

Zoology, the science of animal life, is the study of the structure, functions, development, and classification of the various animal forms. The student may major in *Zoology*: because of a general educational interest in the subject; because of his avocational interest in nature study; or to prepare for professional work in pure science or in applied zoology. Fish and game research, important in the conservation of our natural resources, is an example of applied zoology. Students who are interested in entering the fields of applied zoology should plan to secure advanced degrees since positions in these fields are difficult to obtain without graduate study. Undergraduate preparation for students who are interested in applied zoology generally should parallel that of any students planning to enter graduate work in zoology. Students who are interested in Forest Game Management are advised to consider registration in the curriculum of that name offered by the Department of Forestry in the College of Agriculture.

The University of New Hampshire's location on tidewater and near the open ocean provides an unusual opportunity for the study of marine zoology and marine ecology.

All students who major in *Zoology* are expected to meet in full the requirements of the General Liberal Arts curriculum (page 91) with grades

* Each student's individual program will be considered with regard to breadth and individual needs in assigning courses in related departments. Approval must be secured in advance of registration for credit for courses in this area.

of C or better in 24 semester credits in Zoology. Related courses in other departments may be counted for major credit with the consent of the supervisor. Minimum course requirements for Zoology majors include: Zoology 7-8, Zoology 18 (4 cr.) or 57 or 59, and Botany 3 or 6; eight of the 24 major credits must be in courses numbered 51-100. *Zoology majors are also required to present credit for Chemistry 3-4 and a course in Organic Chemistry (Chemistry 45, 51-52, or Biochemistry 1.) These courses in Chemistry cannot be counted as part of the 24 major credits.*

Students who are interested in a *Zoology* major are advised to consult with the supervisor, Professor Philip J. Sawyer.

OTHER PROGRAMS OF STUDY

Although pursuing his studies in the College of Liberal Arts in one of the major fields just outlined, the student may also prepare himself for some related objectives. Two of these are described below, and there is enough freedom of election to make it possible for the student, in consultation with his supervisor, to arrange others.

Pre-Dental

Students who plan to enter a school of dentistry may follow the Pre-Medical curriculum (page 82), or they may elect to major in almost any field offered under the General Liberal Arts curriculum (pages 64-77). The student's program should include courses in comparative anatomy, physics, and organic chemistry. Students who plan to enter a school of dentistry, either before or after achieving the bachelor's degree, are advised to consult with Professor Paul E. Schaefer.

Pre-Law

While the various bar associations and law schools do not prescribe a specific undergraduate curriculum for future lawyers, they recommend that a student who contemplates entering law school should plan a study program which will develop breadth of view and facility of expression. They also urge him to acquire a background of information concerning the society in which he lives and the forces which have shaped modern institutions. They urge him particularly to perfect his use and understanding of the English language in writing and speaking.

The courses considered most helpful are those which develop oral and written expressions, deal with man's social, economic, and political institutions, provide an understanding of the human mind, and develop the art of thinking. A course in the elements of accounting may be useful.

A number of law schools require the *Law School Admission Test of* students seeking admission; each law school will advise a student upon request whether or not he will be expected to take the test in partial satisfaction of admission requirements. Particulars of the examination may be obtained at the office of the Department of Government.

Students who plan to enter law school after graduation are advised to consult with Professor John H. Holden, Chairman of the Department of Government, as soon as they have made their decision.

PRESCRIBED CURRICULA

Several prescribed programs of study, intended to provide preparation for business or professional life, are available to students in the College of Liberal Arts. They are arranged in such a manner as to permit considerable specialization while conserving the breadth and general culture of the stu-

dents enrolled in them. They are less broad and general, however, than the *General Liberal Arts* curriculum. They are professional in character. All *Prescribed* curricula lead to the degree of Bachelor of Science.

Business Curriculum

One curriculum with an option is offered in this field: a curriculum for students who do not desire to specialize in any particular phase of business; an option for those desiring to specialize in accounting. The Business curriculum provides for general education as well as for professional preparation in business subjects. For students interested in marketing and distribution, in finance, or in labor and personnel administration, a list of courses in these areas is offered. Students may choose electives from these groups. Many of the graduates of the *Business* curriculum are successfully filling responsible positions with accounting, banking, insurance, merchandising, and manufacturing concerns.

The *Business* curriculum is planned to emphasize foundation or general courses in the freshman and sophomore years with specialization coming largely in the junior and senior years. The program is outlined on pages 95 and 96. Students registered for this curriculum are held for the requirements expected of students in all prescribed curricula (page 93). Students pursuing the *Business* curriculum must obtain grades of C or better in 24 semester credits from the following courses; Business Administration 1-2, 21-22, 23, 34; Economics 1-2, 25, 31, 51, 53, 56; and Speech 15. Of the required courses in Economics and Business Administration, at least 12 semester credits shall be earned at the University of New Hampshire.

Students pursuing the *Accounting* option must obtain grades of C or better in 24 semester credits from the following courses: Business Administration 1-2, 3-4, 7-8, 21-22, 23, 55, 56, 57, 61, 68; Economics 1 2. 25, 31, 53, 56; and Speech 15. Of the required courses in Economics and Business Administration, at least 12 semester credits shall be earned at the University of New Hampshire, and at least six of these semester credits shall be in accounting courses.

Students interested in registering for the *Business* curriculum or the *Accounting* option should consult with the Chairman of the Department, Professor Arthur W. Johnson. Those who elect either of the curricula will be assigned to a member of the department staff who will act as supervisor for the duration of the student's course.

Hotel Administration Curriculum

The hotel administration program gives basic preparation for careers in professional management and technical specialist positions in the hotel, motel, club, and food service fields. Many graduates become managers of city and country clubs, industrial, school and university food services as well as hotels, motels, and restaurants. Others are more qualified for technical specialty careers in hotel sales, institutional food sales, accountants and cost controllers in hotels or restaurants, or teachers in high schools and colleges offering food service courses. Still others work for government agencies dealing with travel and vacation businesses; some become journalists for periodicals concerning these fields or enter the travel agency business.

To insure that graduates know both the basic skills as well as the broad field of hotel administration, each student is required to complete at least two summer practicums of on-the-job experience. This work is directed and evaluated by the Department and University credit is given as well as a modest wage plus room and board. Transfer students and others may satisfy part or all of practical experience requirement by

presenting evidence of having performed similar work. Five practicums are available: restaurant management, front-of-the house in a commercial hotel, back-of-the house in a commercial hotel, club management, and institutional food service.

The *Hotel Administration* curriculum is outlined on page 97. Interested students should consult with Professor Donald E. Lundberg.

Medical Technology Curriculum

There is now a large and increasing demand for medical technologists. Public health and medicine depend more and more upon the laboratory. Professional technicians are needed to perform various laboratory techniques and tests, such as blood typing, blood counts, tissue sections, urinalyses, and bacteriological and serological tests. Positions in this field are available in hospital laboratories, physicians' and surgeons' clinics, and in health department laboratories.

Students who are interested in becoming medical technologists should register in the Prescribed curriculum in *Medical Technology*. In this program students will be take their freshman, sophomore and junior year's work at the University and their last year's work at the Mary Hitchcock Memorial Hospital School of Medical Technology, Hanover, New Hampshire. After satisfactorily completing the courses at the School of Medical Technology (Biology 61-62), the student is awarded 32 credits toward the Bachelor of Science degree. This program also qualifies the student for the examination for the Medical Technologist's certificate administered by the Registry of Medical Technologists of American Society of Clinical Pathologists. Thus a student can obtain the B.S. degree from the University and the M.T. certificate in a four-year period. Students who complete this curriculum are well qualified for work in any hospital or medical laboratory. The curriculum is outlined on page 99.

At the present time, the fees for the senior year include a University tuition fee of $50 for New Hampshire residents and $120 for non-residents and a maintenance fee of $300 (including room and board) at the Mary Hitchcock Memorial Hospital School of Medical Technology. The latter institution has a stipend program which provides $600 for students meeting the requirements of this program.

Students in the *Medical Technology* curriculum are held for the requirements expected of students in all prescribed curricula (page 93). They must also obtain grades of C or better in 24 semester credits from the following courses: Zoology 17, 18; Microbiology 1, 8, 53; Chemistry 17, 45; and Biochemstry 56.

Students who in their junior year decide not to take the training program at the Mary Hitchcock Memorial Hospital School of Medical Technology will find it possible to transfer to a major in the General Liberal Arts curriculum, such as Microbiology or some other biological science. In such case, they would have to satisfy a language requirement which may be met by passing a reading test based on two years of language taken in high school or one year of college language.

Students interested in the Prescribed curriculum in *Medical Technology* are advised to consult with the supervisor, Professor Theodore G. Metcalf.

Nursing Curriculum

Any student who is interested in nursing as a career is encouraged to consider the *Nursing* curriculum. It affords opportunity for examinations for registration as a nurse and enables the student also to secure a college degree. The breadth of training beyond that usually received in a hospital

training school is increasingly in demand, particularly for those who aspire to executive or supervisory positions. The curriculum (see page 100) prepares for nursing and also permits the student some specialization in other fields related to nursing.

The student must satisfactorily complete three years of work (a minimum of 96 credits) in residence at the University of New Hampshire with a minimum cumulative grade point average of 2, and graduate from a school of nursing approved by the University. The length of the training period will vary with the several schools of nursing.

A student registered in the curriculum is held for the requirements expected of students in all prescribed curricula (page 93). *This curriculum is intended to precede hospital training.*

Students interested in selecting the *Nursing* curriculum are advised to consult with the supervisor, Professor Edythe T. Richardson.

Occupational Therapy Curriculum

An ally to the medical profession occupational therapy is any activity, mental or physical, prescribed by a physician and administered by a registered therapist to aid in the recovery or the rehabilitation of the patient.

The successful practice of occupational therapy requires not only thorough academic preparation but also suitable personality combined with judgement, dependability, tact, tolerance, patience, and will to serve. A high degree of mental and physical health is essential. Occupational therapy requires physical vitality and emotional stability.

The course admits both men and women who can meet entrance requirements.

Before the beginning of the sophomore year, in the case of freshman students who are interested in the Occupational Therapy curriculum (or before admission into this curriculum in the case of students who transfer from other majors or from other colleges), a series of tests will be given to assist the supervisor in advising the student of his or her fitness for entering this curriculum. The curriculum is outlined on page 101.

Because of the highly specialized nature of the Occupational Therapy curriculum, students are advised to enter this program not later than the beginning of their sophomore year; otherwise, they should expect to spend additional time in working toward the Bachelor of Science degree. Students seeking to transfer to the University of New Hampshire from other accredited collegiate institutions must arrange, through the Admissions Office, an appointment with the supervisor of the curriculum or the Department Chairman prior to admission to the curriculum in order that the applicant may be fully aware of the problems involved in completing the requirements for the degree.

The curriculum in *Occupational Therapy* is designed to satisfy the occupational therapy curriculum requirements of the American Medical Association as well as to offer a four-year course leading to the Bachelor of Science degree. This includes the theoretical subjects needed in the medical fields as well as a wide range of skills and crafts used as therapeutic occcupational therapy modalities in the treatment of patients.

It is recommended that the student interested in the *Occupational Therapy* curriculum spend one summer in an occupational therapy department in either a hospital or a children's camp. This should be done before the student enters the clinical affiliation program.

At the completion of the requirements of the curriculum, the student will spend a minimum of ten months in student affiliation in approved hospitals or services under the direction of a registered occupational therapist. The occupational therapy student is expected and should plan to take the ten

months' clinical affiliation period in a continuous sequence directly after receiving her assignments from the supervisor of the curriculum. *When this internship is satisfactrily completed, the student is entitled to a Certificate of Occupational Therapy.* The student is then qualified to take examination for registry in the American Occupational Therapy Association. The standard examination is sent out by the Association and administered by the University. A fee of $15 is required by the Association for each examination. While the present demand for qualified therapists is far in excess of the supply, there are relatively few opportunities for those who have not completed the requirements for and entered the Registry of the American Occupational Therapy Association.

A student affiliation fee of $95 for residents of New England and $200 for non-residents of New England is payable to the University by those students who enter the clinical affiliation program.

Ten months of student affiliation in approved hospitals is divided as follows:

General Medicine and Surgery — two months
Pediatrics — two months
Psychiatry — three months
Physical Disabilities — three months

The American Medical Association requires a physical examination including a tuberculin test prior to hospital affiliation.

Expenses vary during the period of student affiliation. Room, board, and laundry are given students by some hospitals; meals only in other hospitals; while some offer affiliation only. *In all cases, the University must approve living arrangements for student affiliates.* Students will furnish regulation uniforms which are required for student affiliation.

Students who are registered in the curriculum are held for the requirements expected of students in all prescribed curricula (page 93), and in addition must obtain grades of C or better in the following courses: Zoology 17, 18, 19, 64; Occupational Therapy 41, 42, (44), 46, (49), (50). Students interested in the curriculum are advised to consult with the supervisor of the program, Professor Marguerite Abbott, or the Chairman of the Department, Professor George R. Thomas.

Pre-Medical Curriculum

Young men and women who are interested in careers as physicians or surgeons may select the *Pre-Medical* curriculum. Students who successfully complete this curriculum will be eligible for admission to Class A medical schools. However, owing to the large number of applicants for admission to medical schools, usually only those students who stand in the upper third of their class can expect to be admitted.

It is highly desirable that a pre-medical student secure a bachelor's degree, although some medical schools do not require it as a condition of admission. The four years of pre-medical work will not only give the student a foundation for his future medical training, but will also give him an opportunity to secure a broad general education.

The curriculum is outlined in detail on page 102. Students registered in it are held for the general requirements of prescribed curricula (page 93).

Students pursuing the Pre-Medical curriculum must obtain a grade point average of 2.5 or better for the required courses in Biology, Chemistry, Physics, and Zoology.

Students who are interested in this curriculum should consult with the supervisor, Professor Paul E. Schaefer.

Secretarial Curriculum

A large number of college women find pleasant and profitable employment in secretarial positions in private, professional, commercial, and industrial offices. Although in most cases the initial appointment is to a subordinate position in an office organization, the breadth of the college education plus the secretarial skills acquired during the college course give opportunity for early assumption of greater responsibility.

Although the curriculum is essentially semi-professional, it provides for a rather liberal number of electives with which to secure the general education so essential to success.

Women students who are interested in other aspects of business are advised to consider the *Business* curriculum and those interested in less specialization are counseled to consider a major in *Economics* in the General Liberal Arts curriculum.

Women who are preparing to teach commercial subjects in high school should consult the description of the *Commercial Teacher Preparation* program which appears on page 86.

The *Secretarial* curriculum is outlined in detail on page 103. Secretarial students must earn grades of C or better in the following courses: Secretarial Studies 3-4, 9-10, 17; Secretarial Studies 11, 13, 18 (unless excused in accordance with the statement below). In addition, secretarial students must earn at least a C grade in 4-11 credits (to make a total of 24 semester credits) of work in the following courses: Secretarial Studies 22, *Advanced Transcription;* Secretarial Studies 23-24, *Business Writing;* Economics 3, *Economic and Commercial Development of the U. S.;* Business Administration 1-2, *Elementary Accounting;* Business Administration 21-22, *Commercial Law;* or Business Administration 24; *Introduction to Business.*

Students transferring from collegiate institutions and high-school students with previous training in secretarial subjects are required to take the following courses: Secretarial Studies 3-4, 9-10, 17; Secretarial Studies 11, 13, 18 (unless excused). These students may be excused from:

Secretarial Studies 11 by passing a 40-period certificate test.

Secretarial Studies 13 by passing a theory and practice test on each of the machines taught.

Secretarial Studies 18 by giving satisfactory evidence of having done acceptable secretarial work in a business office for one year. "One year" shall be interpreted as not less than 50 weeks of full-time work. Full-time work done continuously for two weeks or more may be counted toward a year's work. Part-time work of less than 30 hours a week may not be considered. Only part-time work of 30 hours a week or more done continuously for at least 6 weeks may be counted toward a year's full-time work. The number of hours of acceptable part-time work will be divided by 40 to find the equivalent number of weeks of full-time work. *(Work done for relatives will not be considered.)*

Transfer and high school students who have had one year of Gregg shorthand (or the equivalent of one year) in another institution and have earned a grade of 80 or better (where the passing grade is 70) will not be allowed to enroll in Secretarial Studies 1 for credit; likewise, those students who have had one year of typewriting (or the equivalent) in another institution and have earned a grade of 80 or better (where the passing grade is 70) will not be allowed to enroll in Secretarial Studies 7 for credit (see below).

Secretarial students who have had Secretarial Studies 5 at the University of New Hampshire or a similar course in another collegiate institution, or

one semester of typewriting in high school or preparatory school, will be required to enter Secretarial Studies 27 instead of Secretarial Studies 7.

Students registered in this curriculum are held for the general requirements expected of students in all prescribed curricula (page 93). Students interested in registering for the *Secretarial* curriculum should consult with Professor Doris E. Tyrrell.

Social Service Curriculum

Social Service includes, among others, the following fields: family case work, child care, child placement, settlement and neighborhood house, institutional work for defectives and dependents, state and local welfare work, probation, correctional school and prison service, Y.M.C.A. and Y.W.C.A. service, municipal playground direction, child guidance clinics, community chest work.

For full recognition in social service, it is important for a man or woman to have completed the two-year professional course in a graduate school of social work. The best preparation for admission to such a graduate school is either a broad liberal arts education with 40 to 60 hours of credit in the social sciences, including a major in *Sociology*, or the *Social Service* curriculum. For able students, scholarship aid toward meeting expenses of graduate study is sometimes available.

There is a continuing serious shortage of qualified workers in nearly all the branches of social work. For this reason, a number of students who complete the *Social Service* curriculum find employment each year, in public welfare, group work, etc., before they commit themselves to graduate study. The program is outlined in detail on page 104. Students registered in it are held to the general requirements of all prescribed curricula (page 93) and in addition must obtain a grade of C or better in 24 semester hour credits from the following courses: Sociology 27, 44, 71, 73, 74, 75, 76, and 97.

Students interested are advised to consult with Miss Pauline Soukaris, Department of Sociology.

PREPARATION FOR TEACHING

The University of New Hampshire offers at the undergraduate level two types of secondary school teacher preparation programs and an elementary school program.

General Liberal Arts curriculum students wishing to teach in secondary schools may follow an advisory program of studies called the University Teacher Preparation program. A student following this program takes Education 41 in the sophomore year. In the junior year he takes Education 57, 58. In the first semester of the senior year he takes Education 59 and an Education 91 course in the field of his major teaching interest. The second semester is devoted to practice teaching.

There are also Prescribed curricula preparing teachers in the fields of Agriculture, Art, Home Economics, Music, and Physical Education (see following pages).

The program for those preparing for elementary school teaching is an unusual one combining liberal education with professional preparation. The student follows the General Liberal Arts curriculum for three years and then devotes the entire senior year to professional study and practice teaching, enrolling in Education 71-72, a 32-credit course.

All of the teacher education programs are selective. For details of the standards set, see the prerequisites for courses in the Department of Education.

Courses in Supervised Training

The work in Supervised Teaching is under the direction of the Coordinators of Student Teaching. Students teach under the immediate direction of selected classroom teachers in schools approved by the University.

In the Supervised Teaching courses the student participates in the conduct of class exercises and in the control of the classroom, at first chiefly as an observer, but gradually entering into teacher responsibilities until complete charge of the classroom is assumed.

This work is required in the University Teacher Preparation programs, but will be open only to students whose applications are approved by the Chairman of the Department of Education and the Coordinators of Student Teaching in the subject or subjects in which the applicant desires to do supervised teaching. *Applications should be filed in the office of the Department of Education on or before November 15 of the academic year in which the superivsed teaching is to be done.*

The applicant must also complete with a grade of at least C a course in the problems of teaching the subject in which he desires to do supervised teaching.

Accreditation

The teacher preparation programs of the University are accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary teachers, secondary teachers, and school service personnel, with the master's degree as the highest degree approved.

Guidance of Students Preparing to Teach

Students who come to the University of New Hampshire for the purpose of preparing themselves for the teaching profession should consult with Professor Everett B. Sackett, Chairman of the Department of Education,in their freshman year. Other students who are seriously considering teaching as a possible profession are urged to consult him before making a decision.

Completion of the approved teacher preparation programs of the University qualify a student for certification as a teacher in virtually all states. There are a few which have unusual requirements for certification. Professor Sackett will be glad to advise students regarding these requirements.

PRESCRIBED CURRICULA IN TEACHING PREPARATION

Agriculture Teacher Preparation Curriculum

A student electing the Teacher Preparation curriculum in Agriculture must meet the general and specific requirements for a degree described on pages 42 and 43 applicable to all students registered in the College of Agriculture. His course of study will follow a broad general program rather than a specialization in any particular field. Furthermore, he must meet the state requirements for certification which include one semester of practice teaching, 14 additional credits of courses in Education, and 8 credits of Agricultural Engineering. In addition he must have had a farm upbringing prior to enrolling in the Teacher Preparation curriculum in Agriculture, or two years of agricultural experience, one year of which must have been continuous in a standard commercial farm enterprise.

Local school boards are beginning to appreciate more fully the value of instruction in agriculture, both for the boys who will engage in agriculture after leaving high school, and as electives to maintain the interest of those young men who may wish to take at the University further education in

this basic industry. As a result, there are a good many positions open for young men who wish to make the teaching of agriculture their profession.

Art Education Curriculum

This curriculum is designed to prepare teachers and supervisors of art in the public schools. It is based upon the demands for teachers who possess developed skills in the arts and a broad general culture in addition to a specialized preparation in Art Education. The satisfactory completion of the curriculum will satisfy the initial certification requirements for teachers of art in the public schools in New Hampshire and in other states.

Freshmen who plan to enter this curriculum should elect Arts 23-24, *Basic Design* and *Drawing and Design,* in their first-year program.

A grade of C or better must be achieved in all Arts courses required in the curriculum.

Students who wish to prepare themselves to teach other subjects in addition to art can do so by using their elective hours for this purpose. Such a program should be worked out in consultation with Professor Everett B. Sackett of the Department of Education.

Students registered in the curriculum (see page 105) are held for the general requirements expected of students in all prescribed curricula (see page 93).

Students seeking to transfer to the University of New Hampshire from other accredited collegiate institutions must arrange an appointment with the supervisor of the curriculum or the Department Chairman prior to admission to the curriculum in order that the applicant may be fully aware of the problems involved in completing the requirements for the degree.

Interested students should consult with the supervisor, Professor George R. Thomas.

Commercial Teacher Preparation Program

This program is an option in the Prescribed Secretarial curriculum and is not a Prescribed curriculum in itself.

Students preparing to teach commercial subjects in high school should include in their freshman programs Secretarial Studies 7-8 and electives from Group III; in their sophomore programs, Secretarial Studies 1-2, Business Administration 1-2, and 24, Economics 3, Education 41, and an elective from Group I; in their junior programs, Secretarial Studies 3-4, 9-10, 13, and 23-24, Business Administration 21-22 and Education 57 and 58; in the Summer Session between their junior and senior years, Commercial Subjects-Education 91, *Problems in the Teaching of Commercial Subjects in the High School.* Such students should enroll for 18 semester credits in at least one semester in order to have the second semester of the senior year free for supervised teaching.

Interested students should consult with the supervisor, Professor Doris E. Tyrrell.

Home Economics Education

This curriculum is designed to prepare teachers of home economics for the secondary education program. See page 59 for the program outlined for Home Economics Education. Satisfactory completion of this curriculum will meet the certification requirements for teachers of home economics.

Students who are interested should consult with the Chairman of the Department of Home Economics.

Music Education Curriculum

This curriculum is designed to prepare teachers of music for the public schools. It is based on the demands for teachers possessing sound musicianship and a broad general culture in addition to a specialized preparation in music education. This program is fully accredited by the State Department of Education and complies with standards set up for certification of teachers and supervisors of music in most states. Training for teaching in both the elementary and secondary schools is included in the program. The Department is also actively affiliated with the Music Educators National Conference.

To be admitted to this curriculum the student must give evidence of having a sound musical background. *Freshmen who plan to enter this curriculum must elect Music 9-10 and four hours of Applied Music in their first year program.*

A grade of C or better must be achieved in all music and education courses required in the curriculum.

Public school music teachers must maintain a satisfactory standing musically with other professional musicians in the community and should be able to play or sing acceptably. For this reason, *16 semester credits in Applied Music are required before graduation.* Students will be encouraged to accumulate up to eight semester credits in one instrument or in voice. In addition, all candidates are required to meet minimum standards of performance in piano, voice, a woodwind instrument, a brass instrument, a string instrument, and percussion. Candidates are expected to meet the piano and voice requirements by the end of their junior years. The minimum instrumental standards may be met by special examination, or may be demonstrated during the time the candidate is registered for Applied Music in these instruments. Details of minimum standards of performance may be obtained from the Supervisor of the Music Education curriculum.

Recitals. Students enrolled in the *Music-Education* curriculum must accumulate a minimum of 24 points in the sophomore, junior, and senior years. Attendance at each concert or recital constitutes one point.

The curriculum is outlined in detail on page 106. Students who are interested should consult with the supervisor, Professor John B. Whitlock.

Physical Education Teacher Preparation Curriculum (Men)

This curriculum is for men students who plan to prepare themselves for positions as teachers of physical education, teachers of physical education and coaches of athletic teams, or teachers in two subject-matter fields and coaches of athletic teams in secondary schools (see page 108). *It is open to men who have satisfactorily completed the freshman year, and are approved by the Department of Physical Education for Men for admission to Physical Education as a field of concentration.* A grade of C or better must be achieved in Physical Education 23, *Principles of Physical Education*; Physical Education 61, *Problems of Teaching in Physical Education*; Physical Education 65, *Administration of Physical Education in Secondary Schools*; and in 24 semester credits in the second teaching major.

This curriculum requires the satisfactory completion of a second teaching major of 24 semester credits and a teaching minor of 12 semester credits in subjects taught in high school. Students registered in this curriculum are held for the general requirements expected of students in all prescribed curricula (page 93). Students who are interested in this program should consult with the supervisor, Professor Carl Lundholm.

Physical Education Teacher Preparation Curriculum (Women)

For women students who plan to prepare themselves for positions as teachers of physical education or for positions in recreation education, the University has organized the Physical Education Teacher Preparation curriculum for Women (see page 110). This curriculum will enable women to elect, at the end of the sophomore year, the *Physical Education* option or the *Recreation Education* option. Furthermore, students have the opportunity, if they so desire, to prepare themselves to teach in a subject matter field as well as in physical education. The curriculum is open to women who have satisfactorily completed the freshman year and are approved by the Department of Physical Education for Women for admission to that field of concentration. It provides an opportunity for students to teach physical education and to assist in recreation programs, under supervision, in nearby schools and recreation centers.

Any student in this curriculum who is planning to teach in areas in addition to physical education must complete with an average grade of C or better a second teaching major of 18 semester credits in subjects taught in high schools.

For students choosing the *Physical Education* option, the following courses offered by other departments are suggested as valuable electives: Arts 4, *Crafts;* Microbiology 5, *Public Health and Sanitation;* Speech 15; *Public Speaking;* Home Economics 84, *Personal, Family, and Community Health;* Humanities 1-2, *Humanities;* Music 37-38, *Introduction to Music Literature;* Psychology 37, *Developmental Psychology;* Psychology 47, *Mental Hygiene;* Sociology 1, *Introductory Sociology;* Sociology 45, *Rural-Urban Sociology.* Physical Education 24, *Organized Camping,* is also recommended. Students in this curriculum are advised to choose non-professional electives whenever possible. Those planning to enter graduate study should elect a foreign language.

In the Physical Education option a grade of C or better must be achieved in 24 semester credits in the Physical Education courses required by the curriculum. A minimum of one summer as a camp counselor or playground leader is highly recommended for students choosing the *Physical Education* option.

Students choosing the *Recreation Education* option are advised to become skilled in at least two of these five fields: art, drama, music, outdoor education, or physical education. The following courses offered by other departments are suggested as valuable electives for recreation specialists: Arts; Speech 15, *Public Speaking;* Government 6, *Principles of American Government;* Music 23, *Piano;* Music-Education 90, *Problems in the Teaching of Elementary School Music;* Psychology 47, *Mental Hygiene;* Psychology 63, *Differential Psychology;* Sociology 33, *Cultural Anthropology.* Physical Education 56, *Health Education,* and Physical Education 63, 64, *Theory of Team Sports,* are also recommended.

Recreation Education students desiring a major emphasis in Forestry Recreation and outdoor education are advised to take Forestry 61, 62, *Problems.* Those interested in a major emphasis in Hospital Recreation are advised to take Zoology 19, *Kinesiology,* and Physical Education 55, *Remedial Gymnastics.*

To make certain that the *Recreation Education* option contains some experience under working conditions, each student is required to secure during a summer before graduation a minimum of 8 points in actual leadership of recreational activities in such places as community centers, hotels, playgrounds, and camps where supervision will be authorized. A record of such activities will be kept by the student and submitted to the supervisor of the curriculum for crediting. Each week will constitute 1 point.

The students in the Recreation Education option must complete, with a grade of C or better, 24 semester credits in the physical education, arts, music, outdoor education, and drama courses offered by the curriculum.

Under Physical Education 1, 2, 3, 13, 14, 5, 6, Physical Education curriculum students are required to include certain activities, in many cases in sections especially reserved for them. *During the freshman* year the student must register for one quarter each of the following, preferably in the order listed: fundamentals, tennis, badminton, skiing, lacrosse (and swimming, basketball, and volleyball if they have not had them previously); in the *sophomore year,* tennis (int.), hockey, stunts and tumbling, figure skating, elementary games, skiing (int.), dance survey, outdoor education and archery; in the *junior year,* golf, folk and square dancing, modern dance (elem.), and modern dance (int.). In addition, apparatus and gymnastics should be taken in the senior year.

For those who are highly skilled in the activities mentioned and for *Recreation Education* majors, substitutions are made with the approval of the supervisor. (For example, practice leadership and American country dance are required in the *Recreation* option.) Further dance and other activities not listed are included in courses for students in the Prescribed curriculum.

Students who are following any teacher preparation curriculum in the University are urged to include for Physical Education: American country dancing, folk dancing, recreation workship, hockey, basketball, volleyball, and softball.

Students registered in this curriculum are held for the general requirements expected of students in all prescribed curricula (see page 93). The curriculum is outlined on page 110. For further information concerning this curriculum consult the supervisor, Professor Marion C. Beckwith.

A PLAN FOR INDEPENDENT STUDY

A student with a distinguished academic record who desires more freedom of choice in the final years of his academic program may offer for approval by his program supervisor a special program for independent study. Such a program replaces in part courses usually taken under the regular curricula. This plan of independent study enables such students to pursue intensively work in a limited field of study or to integrate the subject matter of two or more fields.

A junior or senior in the College of Liberal Arts may register for from 6 to 12 semester credits of Independent Study for any single academic year, provided: (a) his cumulative academic average is 3.0 or better, and (b) he has submitted a plan for Independent Study that has been approved by his supervisor. The student accepted for Independent Study is designated a "College Scholar".

A College Scholar must meet all general College requirements. He may, at the discretion of the supervisor, submit independent study credits in whole or in part for major course requirements in the General Liberal Arts Curriculum or for elective credits in a Prescribed Curriculum.

A College Scholar is advised by a member of the staff of his major department. His program may be either in the form of (a) a project, such as a research paper, a series of experiments, or the writing of a creative piece of literature, or (b) preparation for a special comprehensive examination. The results of a College Scholar's activitiy under the plan

for Independent Study will be judged by three members of the Faculty selected by his supervisor and department chairman.

Each student is expected to attend a series of three colloquia, which are considered an integral part of the program, each semester that he is enrolled. These colloquia are of a general nature so as to assure the combined interest of the students who share in the program.

Dr. John T. Holden is Director of the Independent Study Program.

A PLAN FOR TWO BACHELORS DEGREES IN FIVE YEARS

It is possible for competent students to choose courses that will satisfy the requirements for baccalaureate degrees in both the College of Liberal Arts and the College of Technology within a five-year period. Anyone interested should confer with the deans of both Colleges as early in his academic career as possible, and, if approved for the dual program, should expect to work closely with advisers for both Colleges.

THE FORD FOUNDATION SCHOLARSHIP PROGRAM

A limited number of freshmen each year are selected from those who apply for a special five-year program leading to the B.A. and M.A. degrees. The program is limited to superior students who expect that their chosen vocation shall be teaching at the college level. The regular General Liberal Arts requirements for the B.A. degree and the Graduate School requirements for the M.A. degree are basic requirements. In addition the student is expected to attend special seminars, incorporate a minor area of study as well as a major, complete special work in mathematics, languages, reading, and writing. During the last three years of the program, he will be assigned to his major department as an intern in teaching.

Prospective freshmen with superior high school records who are interested in this program should consult the principal or counselor in their high schools or write to the Director of Admissions at the University for more information.

REQUIREMENTS FOR DEGREES

The degree of Bachelor of Science is conferred upon those students in the College of Liberal Arts who successfully complete the requirements of a *Prescribed* curriculum. The degree of Bachelor of Arts is conferred upon all students in the College of Liberal Arts who successfully complete the requirements of the *General Liberal Arts* Curriculum.

A student's candidacy for a degree will be determined by his having satisfied the University, College, major, or curriculum requirements in force at the time of his admission to the College either as a beginning student or as a transfer. A student may petition to satisfy the University, College, major, or curriculum requirements that may be in force at any time during his residence. Such a student shall be held, however, for *all* the academic requirements of the catalogue under which he seeks a degree; not a portion thereof. *The new catalogue becomes effective on July 1 of each year.*

Each candidate for a degree in the College of Liberal Arts must complete successfully 128 semester credits and achieve a 2 *grade point average* in all courses completed at the University. In addition, he must complete the requirements given below and those of the major field, or Prescribed curriculum, as stated in the preceding pages.

A. General University Requirements

Physical Education for men	Freshman year
Physical Education for women	Freshman and sophomore years
R.O.T.C. for men	Freshman and sophomore years

B. General College Requirements

1. Special Requirements of the Freshman Year

(If not completed in the freshman year, they must be taken as soon as available.

*a. English 1-2, *Freshman English*
*b. A biological science (Biology 1-2; Botany 1, Biology 2; or Biology 3) or a physical science (Chemistry 1-2†; 3-4; or 5-6; Geology 1-2; Mathematics (2), (3); 5, (7); or 7-8; Physical Science 1-2; Physics 1-2‡).

2. Special History Requirement *(to be taken in the freshman year except for those students who are registered for the freshman program of the Medical Technology curriculum)*
*History 1, 2, *Introduction to Contemporary Civilization*

3. All freshmen in the College of Liberal Arts are assigned on registration to advisers who counsel them until they have officially selected major departments or Prescribed curricula. Official declaration of a major or a prescribed curriculum is accomplished by a special form which must bear both the adviser's and the supervsor's signature.

4. Students in both the *General Liberal Arts* curriculum and *Prescribed* curricula are advised against over-specialization. Although no attempt is made to limit by regulation the number of courses in a major or the professional courses in a Prescribed curriculum, more than 36 semester credits in courses in the major department, or more than 66 semester credits in professional courses in a Prescribed curriculum, constitute excessive concentration and the supervisor or Dean of the College may not approve schedules that reveal over-specialization.

5. Students are advised that a limited amount of credit earned in music organization, discussion and debate practice, and theater practice may be counted toward a degree. (See music organizations and speech and drama courses in debate practice and theater practice in the Description of Courses.)

C. General Liberal Arts Curriculum Requirements

Each candidate for a degree in the *General Liberal Arts* curriculum must satisfy (1) the General University Requirements, (2) the General College Requirements listed below and those of the major as described in preceding pages.

1. Special Language Requirement
Prior to July, 1961, all students who pursued the *General Liberal Arts* curriculum were required to pass a test of reading ability in one of the following languages: Classical Greek, French, German,

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* Not counted toward fulfillment of Major or Group requirements.
† Chemistry 1-2 does not fulfill the requirement for pre-medical students or Biology majors nor the prerequisite for further courses in Chemistry.
‡ Students who expect to major in Physics should not register for Physics 1-2, but should elect Mathematics 21-22, and Physics 18, to be able to schedule Mathematics 23, 24, and Physics 23-24 in the sophomore years. (See description of Physics major page 75.)

Italian, Latin, Russian, or Spanish. Students pursuing the *General Liberal Arts* curriculum after July, 1961, are required to pass a test of general competence in one of the languages mentioned above. The test is based on the achievement of students after completion of beginning courses in languages at the University of New Hampshire (French 1, Spanish 1, German 1, Russian 1-2, Latin 1-2, Greek 1-2, Italian 1-2). Usually two to three years of high school work are adequate preparation for this test. This examination will consist of an oral-aural test as well as a comprehensive written examination and will test the student's ability to comprehend and read texts of moderate difficulty and answer questions based on that text.

A student may also complete his college requirement by passing one of the following courses: French 1, Spanish 1, German 1, Russian 2, Latin 2, Greek 2, Italian 2, and Latin 2, or any language course numbered higher.

In the event a student does not pass the competence examination he must make a written application for permission to repeat the examination showing that he has improved his preparation through completion of a course or through tutoring or supervised study. Application forms are available in the office of the Department of Foreign Languages and Literatures.

The competence tests are normally given three times a year: during Orientation week, on the last week of classes in May, and at the end of the Summer Session.

Those graduating in February, who have not previously passed the examination, may take it at the end of January by petition.

2. Group Requirements. *(It is expected that these requirements will normally be completed by the end of the sophomore year.)*

A student whose major is included in Groups I, II, or III shall present for the satisfaction of that group requirement some course outside of his major field. *A student may not offer in fulfillment of the Group I requirement the elementary course in the language in which he satisfies the special language requirement.*

I. A student must successfully complete a year's work (two sequential semesters) in this group.
   a. Arts 31, 32
   b. English 13, 14, or 15, 16
   c. Humanities 1-2
   d. Languages
   e. Music 37-38
   f. Philosophy 5, 8 or 21, 22
   g. Speech and Drama 21, 24

II. A student must successfully complete a year's work (two sequential semesters) in this group (students electing a biological science during their freshman year must elect a physical science during their sophomore year, or *vice versa*):
   a. Biological Science (Biology 1-2; Botany 1, Biology 2; or Biology 3).
   b. Physical Science (Chemistry 1-2; 3-4; or 5-6; Geology 1-2; Mathematics (2), (3); 5, (7); or 7-8; Physical Science 1-2; Physics 1-2.

III. A student must successfully complete at least 6 semester credits of course work in this group.

a. Economics
b. Government
c. Psychology
d. Sociology

3. Divisional Requirements

The student must meet such divisional requirements as may be established in the division in which he is majoring.

4. Major Requirements

Each student pursuing the *General Liberal Arts* curriculum may select at the end of the second semester of the freshman year, and shall select not later than the end of the second semester of the sophomore year, a major department in which he shall pass courses to a total of 24 semester credits with grades of C or better. Courses in other departments closely related to the major courses may be counted with the consent of the major supervisor. Departments shall designate in the catalogue in their description of courses those which will not count for major credit. In addition to satisfactorily completing (1) 24 semester credits in the major field and (2) the divisional requirements, each student, at the discretion of his major department, may be required to:

a. Pass a comprehensive examination in his major field
or
b. Prepare a satisfactory paper, on a subject approved by his supervisor, in the student's field of concentration.

D. Prescribed Curriculum Requirements

1. A student registered in a Prescribed curriculum must satisfy the General University Requirements and the General College Requirements described in previous pages.

2. *Inasmuch as all Prescribed curricula are intended to furnish professional or semi-professional preparation, students selecting them are held for the successful completion of all the courses prescribed and generally in the sequence in which they are arranged in the curriculum.*

3. A student pursuing a Prescribed curriculum must meet the quality requirements established for that curriculum. (See descriptions of the curricula on preceding pages.)

GENERAL LIBERAL ARTS CURRICULUM

Freshman Year	First Semester Credits	Second Semester Credits
R.O.T.C. *(men)*	0 or 2	0 or 3
P. E. 1, 2 *(women)*	1	1
P. E. 31, 32 *(men)*	½	½
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
*A Biological Science (Biol. 1-2; Bot. 1, Biol. 2; or Biology 3) or a Physical Science *(Chem. 1-2†; Chem. 3-4; or 5-6; Geol. 1-2; Math. (2), (3); 5, (7); or 7-8; Ph. Sci. 1-2; or Phys. 1-2‡)*	3,4,or 6	3,4,or 6
Engl. 1-2, *Freshman English*	3	3
§Electives to meet semester requirements		
	16	16

Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
Elect one year's work from each of the three following groups (see group requirements, page 92):		
Group I. Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24	3	3
Group II. *A Biological Science *(Biol. 1-2; Bot. 1, Biol. 2; or Biol. 3)* or a Physical Science *(Chem. 1-2†; 3-4; or 5-6; Geol. 1-2; Math. (2), (3); 5, (7); or 7-8; Ph. Sci. 1-2; Phys. 2-1‡)*	3,4,or 6	3,4,or 6
Group III. Economics, Government, Psychology, Sociology	3	3
Electives to meet semester requirements		
	16	16

Junior Year		
Major courses and electives to meet semester requirements		
	16	16

Senior Year		
Major courses and electives to meet semester requirements		
	16	16

* Students electing a Biological Science during their freshman year must elect a Physical Science during their sophomore year, or vice versa.

† Chemistry 1-2 does not fulfill the requirement for pre-medical students or Biology majors nor the prerequisite for further courses in Chemistry.

‡ Students who expect to major in Physics should not register for Physics 1-2, but should elect Mathematics 21-22 and Physics 18 to be able to schedule Mathematics 23-24 and Physics 23-24 in the sophomore year. (See description of Physics major page 75.)

§ See Special Language Requirement page 91.

Detailed Description of this Curriculum Appears on Page 91.

BUSINESS CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
*See freshman requirements, page 91.		
B. A. 1-2, *Elementary Accounting*	3	3
	16	16

Sophomore Year

R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
Econ. 1-2, *Principles of Economics*	3	3
Elective from Group I	3	3
Elective from Group III	3	3
Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24.		
Group III.—Six semester credits from Government; History; Psychology; Sociology		
	16	16

Junior Year

B. A. 21-22, *Commercial Law*	3	3
B. A. 23, *Business Communications*	3	
Econ. 25, *Marketing*	3	
Econ. 51, *Labor Economics*	3	
Electives from Economics and Business Administration	3	3
Sp. (15), *Public Speaking*		3
Electives		
	16	16

Senior Year

B. A. 34, *Business Management*		3
Econ. 31, *Economics and Business Statistics*	3	
Econ. 53, *Money and Banking*	3	
Econ. 56, *Corporation Finance*		3
Electives		
	16	16

* Students offering one or more units of Physical Science for admission are advised to elect Biol. 1-2; or 3. Students offering one or more units of Biological Science for admission are advised to elect Physical Science.

Detailed Description of this Curriculum Appears on Page 79.

BUSINESS CURRICULUM
(Accounting Option)

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91.		
B. A. 1-2, *Elementary Accounting*	3	3
Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4 *(women)*	1	1
B. A. 3-4, *Intermediate Accounting*	3	3
Econ. 1-2, *Principles of Economics*	3	3
Elective from Group I	3	3
	16	16
Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24.		
Junior Year		
B. A. 7-8, *Cost Accounting*	3	3
B. A. 21-22, *Commercial Law*	3	3
B. A. 23, *Business Communications*	3	
Econ. 25, *Marketing*	3	
Econ. 56, *Corporation Finance*		3
Sp. (15), *Public Speaking*		3
Electives from Group III	3	3
Electives		
	16	16
Group III.—Six semester credits from Government; History; Psychology; Sociology		
Senior Year		
B. A. 55, *Advanced Accounting*	3	
B. A. 56, *Federal Tax Accounting*		3
B. A. 57, *Auditing*	3	
B. A. 61, *Analysis of Financial Statements*	3	
B. A. 68, *Personnel Administration*		3
Econ. 31, *Economics and Business Statistics*	3	
Econ. 53, *Money and Banking*	3	
Electives		
	16	16

Detailed Description of this Curriculum Appears on Page 79.

HOTEL ADMINISTRATION CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91.		
Chem. 1-2, *General Chemistry*	4	4
H. Ad. 1, *Introduction to Hotel Management*	1	
H. Ad. 40, *Lectures on Hotel Management*		½
H. Ec. 18, *Principles of Food Selection and Preparation*		3
Psych. 1, *General Psychology*	3	
Electives		
	16	16

Sophomore Year		
R.O.T.C. (men)	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
B. A. 1-2, *Principles of Accounting*	3	3
Econ. 1-2, *Principles of Economics*	3	3
H. Ad. 42, *Lectures on Hotel Management*		½
H. Ec. 21-22, *Quantity Foods and Purchasing*	3	3
Sp. 15, *Public Speaking*	3	
Elective from Group I	3	3
Electives		
	16-18	16

Group I. — A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24

Junior Year		
Arts 20, *Drafting and Space Planning*		3
B. A. 9-10, *Hotel and Restaurant Accounting and Control Systems*	3	3
B. A. 23, *Business Communication*	3	
H. Ad. 44, *Lectures on Hotel Management*		½
H. Ad. 55, *Hotel Operation*	3	
H. Ad. 56, *Hotel Engineering Problems*		3
M. E. 40, *Heating and Ventilating*		3
Electives from Group III	3	3
Electives		
	16	16

Group III. — Six semester credits from Government; History; Sociology

Senior Year

H. Ad. 46, *Lectures on Hotel Management*		½
H. Ad. 66, *Hotel Promotion and Sales*		2
H. Ad. 67, *Stewarding and Catering*	3	
H. Ad. 68, *Personnel and Labor Relations in Hotels and Restaurants*		3
H. Ec. 46, *Institutional Textiles*		3
Electives		
	16	16

PRACTICAL EXPERIENCE. To be eligible for graduation a student must have had two summer practicums or satisfy the Department that equivalent experience has been completed.

Detailed Description of this Curriculum Appears on Page 79.

MEDICAL TECHNOLOGY CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91. (Include Biology 1-2; or 3; or Bot. 1 and Biol. 2, and Chemistry 3-4.)		
Math. (2), (3), *Algebra, Trigonometry* or Math. 7-8, *Fundamental Mathematics*	3	3
Electives		
	16	16
Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
Microb. 1, *General Microbiology*	4	
Microb. 8, *Pathogenic Microbiology*		4
Chem. 17, *Introductory Quantitative Analysis*	4	
Chem. (45), *Organic Chemistry*		5
Hist. 1, 2, *Introduction to Contemporary Civilization*	3	3
Electives from Group I	3	3
Electives		
	16	16
Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24.		
Junior Year		
Bio. Ch. 56, *Physiological Chemistry*		5
Microb. 53, *Immunology and Serology*	4	
Zool. 17, *Human Anatomy*	4	
Zool. 18, *Human Physiology*		4
Elective from Group III	3	3
Electives		
	16	16
Group III.—Six semester credits from Government; History; Psychology; Sociology		
Senior Year		
*Biol. 61-62, *Clinical Laboratory Methods*	16	16

* This course starts about June 20 at the Mary Hitchcock Memorial Hospital School of Medical Technology and includes lecture and laboratory work in microbiology, blood bank and serology, clinical chemistry, hematology, laboratory management and ethics, mycology, parasitology, histology, and clinical microscopy. The credits are awarded in time for graduation in June of the following year after receipt of an official transcript of the grades obtained at the School of Medical Technology and certification by the director of this school and the supervisor of the curriculum that the work has been successfully completed.

Detailed Description of this Curriculum Appears on Page 80.

NURSING CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91. (Include Biology 1-2; or 3; or Bot. 1 and Biol. 2.)		
Chem. 3-4, *General Chemistry*	4	4
	16	16
Sophomore Year		
P. E. 3, 4, *(women)*	1	1
Zool. 17, *Human Anatomy*	4	
Zool. 18, Human *Physiology*		4
Elective from Group I	3	3
	16	16
Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24		
Junior Year		
Bio. Ch. 1, *Organic and Biological Chemistry*	5	
Zool. 66, *Elements of Histology and Microtechnique*		4
Electives from Group III	3	3
Electives		
	16	16
Group III.—Six semester credits from Economics; Government; Psychology; Sociology		

Training Period

Credit earned in training at an approved hospital will apply toward a Bachelor's degree. The University should be informed of the training school affiliation. A transcript of the hospital record must be submitted upon completion of the training program. An application for a degree must be filed.

* This curriculum is intended to precede hospital training.

Detailed Description of this Curriculum Appears on Page 80.

OCCUPATIONAL THERAPY CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91. (Include Biology 1-2; or 3; or Bot. 1 and Biol. 2.)		
Arts 23, *Basic Design*	2	
Arts 24, *Drawing and Design*		2
Soc. 1, *Introductory Sociology*	3	
Electives		
	16	16
Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
O. T. 41, *Application of Occupational Therapy*	2	
Psych. 1, *General Psychology*	3	
Psych. (47), *Mental Hygiene*		3
Zool. 17, 18, *Human Anatomy and Human Physiology*	4	4
Elective from Group I	3	3
Electives from Group III	3	3
Electives		
	16	16

Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24

Group III.—Six semester credits from Economics; Government; History

Junior Year		
O. T. 1, 2, *Crafts*	2	3
O. T. (10), *Lettering and Printing*	2	
O. T. 42, *Application of Occupational Therapy*		2
Psych. 37, *Developmental Psychology*	3	
Psych. 54, *Psychopathology*		3
Zool. 19, *Kinesiology*	3	
Zool. 64, *Neurology*		4
O. T. (49), *Clinical Subjects*		2
Electives		
	16	16
Senior Year		
O. T. (6), *Weaving*	3	
O. T. (5), *Jewelry and Metalwork*	3	
O. T. 7-8, *Elementary Processes in Wood and Plastics*	2	2
O. T. 15-16, *Ceramics and Modeling*	2	2
O. T. (44), 46, *Application of Occupational Therapy*	2	3
O. T. (50), *Clinical Subjects*	2	
Elective		
	16	16

Detailed Description of this Curriculum Appears on Page 81.

PRE-MEDICAL CURRICULUM

Freshman Year	First Semester Credits	Second Semester Credits
See freshman requirements, page 91. (Include Chemistry 3, 4.)		
Math. 7-8, *Fundamental Mathematics* (or Math. 5-7, if appropriate)	3	3
	16	16
Sophomore Year		
R.O.T.C. (*men*)	2 or 3	0 or 2
P. E. 3, 4, (*women*)	1	1
Biol. 1-2, *Man and the Living World*	3	3
Chem. (21), *Semimicro Qualitative Analysis*		4
*Language (French or German)	3 or 5	3 or 5
Phys. 1-2, *Introductory Physics*	4	4
‡Social Science	3 or	3
†Elective		
	16-18	16-18
Junior Year		
Chem. 51-52, *Organic Chemistry*	5	5
*Language	3	3
‡Social Science	3	3
Zool. 7-8, *General Zoology and Comparative Anatomy*	5	5
†Elective		
	16	16
Senior Year		
§Humanities Group	3	3
‡Social Science	3 or	3
†Elective		
	16	16

* Either French or German. If the student passes an entrance reading test in either French or German, one year of the same language will fulfill the language requirement. To fulfill the requirement the student must complete either French 2; 3, 4; or 5, 6; German 2; 3, 4; or 5, 6.

† No more than 24 semester hours of Biology (including Botany, Microbiology, Entomology, and Zoology), Chemistry and Physics in addition to the required courses may be taken as elective.

‡ The student must complete 12 semester hours selected from courses in the following departments: Economics, Government, History (other than History 1, 2), Psychology, Sociology. Courses from at least three of the five departments must be presented.

§ The student must complete 6 semester hours from the following courses: Humanities 1-2; Music 37-38; Arts 31, 32; Philosophy; English 13, 14, 15, 16, (or English courses numbered 52-100).

Detailed Description of this Curriculum Appears on Page 82.

SECRETARIAL CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91.		
Electives		
	16	16
Sophomore Year		
P. E. 3, 4, (*women*)	1	1
B. A. 24, *Introduction to Business*		3
Econ. 3, *Economic and Commercial Development of U. S.*	3	
Secl. 1-2, *Shorthand*	3	3
Secl. 7-8, *Typewriting*	2	2
Secl. 23-24, *Business Writing*	3	3
*Electives		
	16	16
Junior Year		
B. A. 1-2, *Elementary Accounting*	3	3
Elective from Group I	3	3
†Secl. 3-4, *Advanced Shorthand*	3	3
†Secl. 9-10, *Advanced Typewriting*	2	2
Electives		
	16	16
Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24		
Senior Year		
B. A. 21-22, *Commercial Law*	3	3
Secl. 11, *Filing*	2	
Secl. (13), *Office Machines*		2
Secl. 17-18, *Office Procedure and Practice*	3	3
Elective from Group III	3	3
Electives		
	16	16
Group III.—Six semester credits from Government; History; Psychology; Sociology		

* Students preparing to teach secretarial subjects must elect in addition a sufficient number of courses in Education to meet state requirements. See page 86 for a description of the Commercial Teacher Preparation program as an option in the Secretarial curriculum.

† A grade of C or better in Secl. 8 will be required of students electing Secl. 9-10; and a grade of C or better in Secl. 2 will be required of students electing Secl. 3-4.

Detailed Description of this Curriculum Appears on Page 83.

SOCIAL SERVICE CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91. (Include Biology 1-2; or 3; or Bot. 1 and Biol. 2.)		
Soc. 1, *Introductory Sociology*	3	
Electives		
	16	16

Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
Microb. 5, *Public Health and Sanitation*	3	
Psych. 1, *General Psychology*	3	
Psych. (47), *Mental Hygiene*		3
Soc. 27, *The Family*	3	
Soc. 44, *Social Psychology*		3
Electives from Group I	3	3
Electives		
	16	16

Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24

Junior Year		
Soc. 71, *Criminology*	3	
Soc. 73, 74, *Introduction to Social Welfare*	3	3
Elective from Group III	3	3
Electives		
	16	16

Group III.—Six semester credits from Economcis; Government; History

Senior Year		
Psych. 54, *Psychopathology*		3
Soc. 75, 76, *Methods of Social Research*	3	3
Soc. 97, *Social Welfare Field Experience*	6	
One course must be elected from: Bot. 6, or 42; Psych. 78; Ent. 2; Zool. 7, 17, 36, or 61	3,4,5	or 3
Electives		
	16	16

Detailed Description of this Curriculum Appears on Page 84.

ART EDUCATION CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91.		
Arts 23, *Basic Design*	2	
Arts 24, *Drawing and Design*		2
Electives		
	16	16
Sophomore Year		
R.O.T.C. *(men)*	2 or 3	0 or 2
P. E. 3, 4, *(women)*	1	1
Arts 15, 16, *Ceramics*	2	2
Arts 25, 26, *Advanced Drawing and Painting*	3	3
Educ. 41, *Educational Psychology*	3	
Elective from Group I	3	3
Elective from Group III	3	3
Elective		
	16	16

Group I.—A year's work (two sequential semesters) from English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24

Group III.—Six semester credits from Economics; Government; History; Psychology; Sociology

Junior Year		
Arts 3, *Crafts*	2	
Arts (27), *Graphic Arts*		3
Arts (28), *Advertising Design* or Arts (38), *Illustration*	2	
Arts 31, 32, *Introduction to The Arts*	3	3
Sp. (37), *Stagecraft*		3
Educ. 57, *Principles of Learning*	3	
Educ. 58, *Principles of Teaching*		3
H. Ec. 31, *Interior Design*	3	
Elective		
	18	16
Senior Year		
Arts 29, *Advanced Painting and Composition*	3	
Art-Ed. 91, *Problems of Teaching Art in Elementary Schools*	3	
Art-Ed. (92), *Problems of Teaching Art in Secondary Schools*	3	
Ed. 59, *Principles of Education*	3	
Ed.-Art 94, *Supervised Teaching*		14
H. Ec. 65, *History of Costume*	3	
Elective		
	16	14

Detailed Description of this Curriculum Appears on Page 86.

MUSIC EDUCATION CURRICULUM

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91.		
*Applied Music	2	2
†Mus. 9-10, *Sightsinging, Ear Training, Dictation I*	0	0
‡Recitals		
Electives		
	16	16

Sophomore Year

R.O.T.C. (*men*)	2 or 3	0 or 2
P. E. 3, 4, (*women*)	1	1
*Applied Music	2	2
Educ. 41, *Educational Psychology*		3
§Mus. 11-12, *Harmony I*	2	2
Mus. 13-14, *Sightsinging, Ear Training, Dictation II*	1	1
‖Mus. 37-38, *Introduction to Music Literature*	3	3
Mus. 41-42, *Principles of Conducting*	1	1
Music Organizations	½	½
Electives from Group III	3	3
Elective	3	
‡Recitals		
	16½-17½	16½-17½

Group III. — Six semester credits from Economics; Government; History; Psychology; Sociology

Junior Year

*Applied Music	3	3
Educ. 57, *Principles of Learning*	3	
Educ. 58, *Principles of Teaching*		3
¶*Language* (French, German, or Italian)	3	3
Mus. 15-16, *Harmony II*	2	2
Mus. 97-98, *Orchestration and Chorestration*	2	2
Music Organization	½	½
Mu.-Ed. 90, *Problems in the Teaching of Elementary School Music*		3
Mu.-Ed. 97, *Techniques and Methods in Brass and Percussion Instruments*	2	
Elective	2	
‡Recitals		
	17½	16½

* For explanation of footnotes, see next page.

Senior Year	*First Semester Credits*	*Second Semester Credits*
*Applied Music	2	
Ed. 59, *Principles of Education*	3	
Mu.Ed. 93, *Problems in the Teaching of Secondary School Music*	3	
Mu.-Ed. 95, *Techniques and Methods in String Instruments*	2	
Mu.-Ed. (96), *Techniques and Methods in Woodwind Instruments*	2	
Music Organizations	1	
Ed.-Mu. (93), *Supervised Teaching of Elementary School Music*		7
Ed.-Mu. 94, *Supervised Teaching of Secondary School Music*		7
Electives	4	
‡Recitals		
	17	14

* A minimum of 16 semester credits in Applied Music must be offered by students in this curriculum.

† Qualified students are exempted from this requirement upon proper notification to the College Dean's office and the University Registrar.

‡ Recitals — Students enrolled in this curriculum must accumulate a minimum of 24 points in the sophomore, junior, and senior years. Attendance at each concert or recital constitutes one point.

§ Although Mus. 9-10 is normally a prerequisite to 11-12, the latter may be taken in the freshman year concurrently with Music 9-10, provided that the student is familiar with the keyboard and can read simple pianoforte music.

‖ This course may be taken during the freshman year.

¶ Students must complete a year course in Language; passing the reading examination does not fulfill this requirement.

Detailed Description of this Curriculum Appears on Page 87.

PHYSICAL EDUCATION
TEACHER PREPARATION CURRICULUM FOR MEN

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91. (Include Biology 1-2; or 3; or Bot. 1 and Biol. 2.)		
Basic course in second teaching major	3	3
	16	16

Sophomore Year

R.O.T.C. (*men*)	2 or 3	0 or 2
Educ. 41, *Educational Psychology*	3	
P. E. (23), *Principles of Physical Education*		3
Second teaching major; Second year	3	3
Zool. 17, *Human Anatomy*	4	
Zool. 18, *Human Physiology*		3
Group III	3	3
Group I	3	3
	18	16-17

Group III. — Six semester credits from Economics; Government; Psychology; Sociology

Junior Year

Educ. 57, *Principles of Learning*	3	
Educ. 58, *Principles of Teaching*		3
P. E. (61), *Problems of Teaching in Physical Education*		3
*Problems of coaching, *P. E. 47, (48)*	4	
*Problems of coaching, *P. E. (45), 46*		4
Second teaching major	3	3
Ed. 59, *Principles of Education*		3
Elective, *first teaching minor*		
	16	16

Group I. — A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24

* For explanation of footnotes, see next page.

Senior Year	*First Semester Credits*	*Second Semester Credits*
Ed.-P. E. 93, *Directed Teaching in Physical Education*	3	
P. E. 65, *Administration of Physical Education in Secondary Schools*	3	
*Problems of coaching, *P. E.* 47, (48)	4	
Problems of teaching, *Second teaching major, i.e., Engl.- Ed. 91, etc.*	3	
†Second teaching major	3	
Supervised teaching in major or majors, *i.e., Ed.-Engl. 94, etc.*		14
Electives		
	16	14

* Four problems of coaching courses are required.

† Students must select for a second teaching major one of the subjects for which Educ. 91 courses are offered. It is important that students acquaint themselves with the prerequisites of the Educ. 91 course in the subject matter of their second teaching major.

Detailed Description of this Curriculum Appears on Page 87.

PHYSICAL EDUCATION
TEACHER PREPARATION CURRICULUM FOR WOMEN

Freshman Year	*First Semester Credits*	*Second Semester Credits*
See freshman requirements, page 91. (Include Biology 1, 2; or 3; or Bot. 1 and Biol. 2; see required activities for Physical Education 1, 2 on page 89.)		
Electives		
	16	16
Sophomore Year		
P. E. 3, 4, *Physical Education*	1	1
P. E. 13, 14, *Physical Education*	1	1
P. E. 23, *Principles of Physical Education*	3	
P. E. (36), *Recreation Leadership*	3	
Educ. (41), *Educational Psychology*		3
Zool. 17, *Human Anatomy*	4	
Zool. 18, *Human Physiology*		3
Elective from Group I	3	3
Elective		
	18	16
Group I.—A year's work (two sequential semesters) from Arts 31, 32; English 13, 14; or 15, 16; Humanities 1-2; Languages; Music 37-38; Philosophy 5, 8 or 21, 22; Speech and Drama 21, 24		
Junior Year		
Physical Education Option†		
P. E. 5, 6, *Physical Education*	1	1
Educ. 57, *Principles of Learning*	3	
Educ. 59, *Principles of Education*		3
P. E. 53, 54, *The Theory of Teaching Dance*	2	2
P. E. 56, *Health Education*		3
P. E. 63, 64, *The Theory of Teaching Team Sports*	2	2
Zool. 19, *Kinesiology*	3	
Elective from Group III	3	3
Electives		
	16	16
Group III.—Six semester credits from Economics; Government; History; Psychology; Sociology		

† Students desiring to teach in areas in addition to Physical Education should plan to take Educ. 58. They should also elect 18 semester hours in a second teaching field.

Junior Year	First Semester Credits	Second Semester Credits
Recreation Education Option*		
P. E. 5, 6	1	1
Sp. 37, *Stagecraft*	3	
Arts 4, *Crafts*		2
Educ. 57, *Principles of Learning*	3	
For. 38, *Nature Education*		3
P. E. 24, *Organized Camping*		3
P. E. 53, 54, *The Theory of Teaching Dance*	2	2
P. E. 73, 74, *The Theory of Teaching Individual Sports for Women*	2	2
Soc. 1-2, *Introductory Sociology: Social Problems*	3	3
Electives		
	16	16

Senior Year		
Physical Education Option		
Ed.-P. E. 92, *Directed Teaching of Physical Education for Women*		6
P. E. 55, *Remedial Gymnastics*	3	
P. E. (66), *Administration of Physical Education*	3	
P. E. 73, 74, *The Theory of Teaching Individual Sports for Women*	2	2
P. E.-Ed. 91, *Problems in the Teaching of Physical Education for Women*	3	
Electives other than Physical Education	3	3
Electives		
	16	16
Recreation Education Option*		
Sp. 62, *Directing*		3
†Music 37, *Introduction to Music Literature*	3	
P. E. (66), *Administration of Physical Education*	3	
P. E. 96, *Recreation Field Work*		6
P. E.-Ed. 91, *Problems in the Teaching of Physical Education for Women*	3	
Soc. 44, *Social Psychology*		3
‡Elective from Group I	3	3
Elective from Group III	3	3
Elective		
	16	16

* In addition to the requirements listed above, each student is required to secure before graduation a minimum of 8 points of community recreation or camping credits. (See page 88.)

† If Music has already been taken in the sophomore year, 3 additional hours in Group I must be taken in the senior year.

‡ This senior requirement may be fulfilled by any two semester courses from the sophomore Group I listing; they need not be sequential.

Detailed Description of this Curriculum Appears on Page 88.

The College of Technology

Robert N. Faiman, *Dean*

John B. Hraba, *Associate Dean*

Chemical Engineering — Electrical Engineering
Civil Engineering — Mechanical Engineering
Chemistry — Mathematics — Physics

GENERAL INFORMATION

The College of Technology is organized to offer its students a vigorous professional education in engineering, the physical sciences, or mathematics. All programs require a basic core of studies in the humanistic-social and life science areas in addition to a thorough grounding in the basic aspects of mathematics and the physical sciences and the specialized studies of the chosen professional area. This pattern of undergraduate work is designed to provide a base either for a successful career in industry or for advanced study at the graduate level. Since modern technology is drawing engineering applications and their scientific bases more closely together, the engineering curricula are oriented to emphasize the theoretical-scientific aspects of engineering with a corollary deemphasis of its more applied phases. The importance of the role and responsibility of the engineer or scientist in modern society is emphasized through study in the humanistic-social areas.

REQUIREMENTS FOR DEGREES

The College of Technology offers the following baccalaureate degrees: Bachelor of Science in Chemical Engineering, Bachelor of Science in Chemistry, Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical Engineering, Bachelor of Science in Mathematics, Bachelor of Science in Mechanical Engineering, and Bachelor of Science in Physics. Each candidate for a degree must satisfy all general University requirements for graduation, complete at least 144 semester credits, including the courses required in one of the four-year curricula described below, and achieve a minimum grade-point average of 2. Each candidate must include in his course of study 24 or more credits in social-humanistic or non-technical courses. Such courses must have the approval of the department in which the candidate is majoring. For information concerning advanced degrees, see the Graduate School catalogue.

CURRICULA

Curricula of the various departments in the College of Technology are revised and modified as required to reflect the patterns of their professional areas and to provide an effective base for the future professional growth of their graduates. Entering students may anticipate that a curricular program as presented, or as subsequently modified, will permit their graduation in four years, assuming normal loads and progress. If a break in attendance occurs, or other than normal progress is made, the curricular requirements and objectives which must ordinarily be satisfied will be those which are in effect at the time of graduation. Specific programs accomplishing this

will be prepared by the student and his adviser for approval by the Executive Committee of the College.

The following four-year curricula are offered:

Chemical Engineering

Chemical Engineering is that branch of engineering which involves the application of chemistry, physics, mathematics, and fundamental engineering principles to the design, construction, and operation of equipment for carrying out chemical processes on an industrial scale at the lowest possible cost. The Chemical Engineering curriculum, therefore, provides the student basic training in the physical sciences, engineering principles, and economics. Although chemical engineering is a distinct profession, chemical engineers are also considered to be members of the chemical profession and a considerable portion of the Chemical Engineering curriculum is devoted to the science of chemistry. However, emphasis is placed upon the large-scale manufacture of chemical products instead of the laboratory phases of chemistry.

Chemistry

This curriculum is intended to prepare the student for the career of a professional chemist in industry and to give a good foundation for graduate study leading to original and independent research.

Instruction is given by lectures, recitations, and carefully supervised laboratory work. The laboratory study is largely individual and the course work of each student is planned to furnish a broad knowledge of chemical science. The student may elect either German or French to enable him to read chemical literature, and he receives a grounding in mathematics and physics necessary for the advanced courses in chemistry. In the senior year, an independent research project is undertaken, permitting the student to use the reference library and chemical periodicals throughout the course of a laboratory investigation.

Civil Engineering

The profession of Civil Engineering, the oldest of the major branches of engineering practice, embraces the functions of planning, design, and construction of buildings, bridges, dams, transportation projects, and public works in general.

The curriculum includes a study of those basic sciences which are essential to the practice of Civil Engineering, and the application of those principles in the classroom, design room, and laboratory. Additional work is provided in the social-humanistic fields to produce a graduate who is technically competent and well adjusted to his social environment.

Electrical Engineering

This curriculum provides instruction intended to prepare the student for graduate study or to begin his career in professional electrical engineering. In the first two years the student concentrates on mathematics and basic sciences which provide essential preparation for the engineering science, analysis, and design courses of the last two years. Since the emphasis is on fundamentals, the curriculum does not provide for specialized training in any particular sub-branch of electrical engineering. In the junior and senior years, however, the student is provided an opportunity to elect courses in particular areas of interest.

Mathematics

The Technology curriculum in Mathematics consists of a thorough grounding in calculus, followed by advanced work in algebra, analysis, applied mathematics, and geometry. Such a program meets the requirements currently set by graduate schools for admission to graduate study in mathematics. It also furnishes the basic mathematical training required of mathematicians in industry and government. Modern science continues to increase its demands on the undergraduate mathematics program and the Technology Mathematics curriculum is subject to continual scrutiny and revision in an effort to keep up with these demands. Every effort is made to give the student of mathematics the most up-to-date possible presentation of the basic subject matter in this field.

Mechanical Engineering

The Mechanical Engineering curriculum is intended to prepare young men and women either for graduate study or to enter the field of professional mechanical engineering. The curriculum provides a firm foundation in the basic physical sciences and the engineering sciences, augmented by a coordinated sequence of social-humanistic courses. Training is provided in the organization and utilization of principles, personnel, and physical resources for the solution of mechanical engineering problems.

Physics

The Technology curriculum in Physics is intended to offer basic training in fundamentals, supplemented by laboratory work, in the various branches of physics. Opportunity is given in the senior year for experimental investigation in some of the fields of physics under guidance of staff members. Such a curriculum prepares its graduates for basic research in industry, the various government research organizations, or for continued academic study toward advanced degrees.

Agricultural Engineering

Agricultural Engineering is offered in the College of Agriculture (see page 50). Basic science and some engineering courses in the curriculum of Agricultural Engineering are given by the College of Technology.

HONORS PROGRAM

The College of Technology, through its various departments, offers the superior student the opportunity to participate in an Honors Program which is individually designed to provide added intellectual incentives and opportunities beyond those offered in the regular curricula. Admission to Honors status is by invitation of the department concerned and with the approval of the Dean of the College. It is limited to those students entering the junior year with at least a 3.0 average.

The program permits the student, with approval of his departmental adviser and the Dean, to develop an individualized plan of study which, within the framework of his chosen professional area, may include appropriate courses from any of the Colleges in the University in lieu of, and/or in addition to, those courses normally prescribed.

JOINT DEGREE PROGRAM IN LIBERAL ARTS AND TECHNOLOGY

Students interested in combining a professional curriculum in engineering or the physical sciences as offered in the College of Technology with the liberal educational opportunities available in the College of Liberal Arts may elect a five-year joint program of study. Students interested should confer as early as possible in their academic careers with the Deans of both Colleges. If a student is approved for the dual program, advisers from both Colleges will assist in the preparation of an integrated plan of study which will provide for the satisfaction of the requirements of both Colleges. Normally, two degrees, Bachelor of Arts and Bachelor of Science, will be awarded upon completion.

CHEMICAL ENGINEERING

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2 or* Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Social-Humanistic Elective	3	
	16½	17½
Sophomore Year		
*R.O.T.C.	( )	( )
Chem. 47-48, *Organic Chemistry*	5	5
Ch. E. 42, *Chemical Engineering Principles I*		3
‡Math. 23-24, *Calculus B3 and Differential Equations* or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
Phys. 23-24, *General Physics II and III*	4	4
Approved Social-Humanistic Elective	3	3
	17	18
Junior Year		
Chem. 83-84, *Physical Chemistry*	5	5
Ch. E. 51-52, *Chemical Engineering Principles II and III*	4	4
Ch. E. 54, *Chemical Engineering Principles IV*		4
E. E. 33, *Fundamentals of Electrical Engineering*	4	
M. E. 25, *Statics*	2	
M. E. 35, *Strength of Materials*		3
Approved Social-Humanistic Elective	3	3
	18	19
Senior Year		
Ch. E. 63, *Chemical Engineering Principles V*	4	
Ch. E. 66, *Chemical Engineering Economics and Plant Design*		4
Ch. E. 67, *Chemical Engineering Thermodynamics*	3	
Ch. E. 68, *Physical Metallurgy*	4	
Ch. E. 69, *Chemical Engineering Project* or *Approved Elective*		3
Approved Social-Humanistic Elective	3	3
Approved Technical Elective	3	6
	17	16

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

TECHNOLOGY CURRICULUM IN CHEMISTRY

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 5-6, *General Chemistry and Qualitative Analysis*	6	6
Engl. 1-2, *Freshman English*	3	3
M. E. 13, *Engineering Drawing*, or Elective	1	
†Math. 21-22, *Calculus B1 and B2, or* Math. 25-26, *Calculus A1 and A2*	5	5
Phys. 18, *General Physics I*		4
	15½	18½
Sophomore Year		
*R.O.T.C.	( )	( )
Chem. 47-48, *Organic Chemistry*	5	5
‡Math. 23, *Calculus B3*	5	
Math. 24, *Differential Equations*, or Elective		3
Phys. 23-24, *General Physics II and III*	4	4
Electives	3	3
	17	15
Junior Year		
Chem. 61-62, *Analytical Chemistry*	5	5
Chem. 83-84, *Physical Chemistry*	5	5
Chem. (55), *Organic Chemistry*		3
Ger. 1-2, *Elementary German*	3	3
Elective	6	3
	19	19
Senior Year		
Chem. (56), *Organic Chemistry*	3	
Chem. 85, *Inorganic Chemistry*	3	
Chem. 86, *Physical Chemistry*		3
Chem. 87, 88, *Chemical Literature and Seminar*	1	1
Chem. 89-90, *Thesis*	6	6
Elective	5	6
	18	16

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 25-26 sequence will substitute a technical elective here.

CIVIL ENGINEERING

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2 or* Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Social-Humanistic Elective	3	
	16½	17½

Sophomore Year		
*R.O.T.C.	( )	( )
C. E. 1, *Surveying*	3	
C. E. 2, *Advanced Surveying*		3
‡Math. 23-24, *Calculus B3 and Differential Equations* or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
Phys. 23-24, *General Physics II and III*	4	4
M. E. 25, *Mechanics, Statics*	2	
M. E. (35), *Strength of Materials*		3
Approved Social-Humanistic Elective	3	3
	17	16

Junior Year		
C. E. 17, *Engineering Materials*	3	
C. E. 25, *Theory of Determinate Structures*	4	
C. E. 50, *Transportation Engineering*		3
C. E. 52, *Fluid Mechanics*		3
C. E. (53), *Fluid Mechanics Laboratory*		1
C. E. 56, *Steel Design*		3
E. E. 33, *Electrical Engineering Fundamentals*	4	
Geol. 7, *General Geology* (or Geol. 1)	2	
M. E. (26), *Mechanics, Dynamics*	3	
M. E. (33), *Thermodynamics*		3
Engl. (23), *Writing of Technical Reports*		2
Approved Social-Humanistic Elective	3	3
	19	18

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

Senior Year

Approved C. E. Elective	3	3
C. E. (54), *Soil Mechanics and Foundations*	4	
C. E. 57, *Theory of Indeterminate Structures*	4	
C. E. 59, *Reinforced Concrete Design*	3	
C. E. 63-64, *Hydraulic and Sanitary Engineering*	3	4
Approved Social-Humanistic Elective		3
Approved Technical Electives		8
	17	18

ELECTRICAL ENGINEERING

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Social-Humanistic Elective	3	
	16½	17½

Sophomore Year		
*R.O.T.C.	( )	( )
E. E. 1-2, *Electrical Engineering*	3	4
‡Math. 23-24, *Calculus B3 and Differential Equations* or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
M. E. 25-26, *Statics, Dynamics*	2	3
Physics 23-24, *General Physics II and III*	4	4
Approved Social-Humanistic Elective	3	3
	17	17

Junior Year		
E.E. 3-4, *Applied Electromagnetics*	3	3
E. E. 5, *Electric Circuits*	3	
E. E. 9-10, *Electronics*	3	4
E. E. 15-16, *Student Branch A.I.E.E.-I.R.E.*	0	0
E. E. 23, 24, *Electrical Laboratory*	2	2
M. E. (35), *Strength of Materials*		3
M. E. 33, 36, *Thermodynamics, Fluid Mechanics*	3	3
M. E. 37, *Mechanical Laboratory*	1	
Approved Social-Humanistic Elective		3
§Approved Elective	3	
	18	18

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ Electives are selected with the advice and consent of the adviser.

Senior Year

English (23), *Writing of Technical Reports*		2
E. E. 17, 18, *Student Branch A.I.E.E.-I.R.E.*	0	0
E. E. 25, 26, *Electrical Laboratory*	2	2
E. E. 45, 46, *Electrical Networks, Fields*	3	3
M. E. (34), *Thermodynamics*	3	
M. E. 65, *Engineering Economy*	3	
Approved Social-Humanistic Elective	3	3
§Approved Elective	4	7
	18	17

§ Electives are selected with the advice and consent of the adviser.

TECHNOLOGY CURRICULUM IN MATHEMATICS

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Engl. 1-2, *Freshman English*	3	3
Chem. 3-4, *General Chemistry*	4	4
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
Phys. 18, *General Physics I*		4
Non-Technical Elective	3	
	15½	16½
Sophomore Year		
*R.O.T.C.	( )	( )
‡Math. 23, 24, *Calculus B3 and Differential Equations*, or	5	3
Math. 24, 27, *Differential Equations and Multi-Dimensional Calculus*	3	5
Math. 41, *Probability*	3	
Math. 42, *Statistics*		3
Phys. 23-24, *General Physics II and III*	4	4
Ger. 1-2, *Elementary German*	3	3
Non-Technical Elective	3	3
	18 or 16	16 or 18
Junior Year		
Math. 51, *Methods of Applied Math. I*	4	
Math. 55, *Fundamental Concepts of Geometry*		4
Math. 61-62, *Higher Algebra I and II*	4	4
Math. 67-68, *Real Analysis I and II*	4	4
Ger. 3-4, *Intermediate German*	3	3
Non-Technical Elective	3	3
	18	18
Senior Year		
Math. (84), *Topology*	4	
Math. 88, *Complex Analysis*		4
§Math. Elective	4	4
French 1, *Elementary French*	5	
Non-Technical Elective	3	6
Elective		3
Senior Seminar	1½	1½
	17½	18½

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ To be chosen from Math. 54, 56, 81, 82, 83, and 96.

MECHANICAL ENGINEERING

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Chem. 3-4, *General Chemistry*	4	4
Engl. 1-2, *Freshman English*	3	3
†Math. 21-22, *Calculus B1 and B2 or* Math. 25-26, *Calculus A1 and A2*	5	5
M. E. 13-14, *Engineering Drawing*	1	1
Phys. 18, *General Physics I*		4
Approved Social-Humanistic Elective	3	
	16½	17½
Sophomore Year		
*R.O.T.C.	( )	( )
‡Math. 23-24, *Calculus B3 and Differential Equations*, or Math. 27-24, *Multi-dimensional Calculus and Differential Equations*	5	3
M. E. 17, *Manufacturing Processes and Design*	3	
M. E. 22, *Materials*		3
M. E. 25, *Statics*	2	
M. E. 26, *Dynamics*		3
Phys. 23-24, *General Physics II and III*	4	4
Approved Social-Humanistic Elective	3	3
	17	16
Junior Year		
E. E. 39-40, *Electrical Engineering*	4	4
M. E. 33, 34, *Thermodynamics*	3	3
M. E. 35, *Strength of Materials*	3	
M. E. 36, *Fluid Mechanics*		3
M. E. 37, 38, *Mechanical Laboratory*	1	2
Approved Social-Humanistic Elective	3	3
§Technical Elective	3	3
	17	18
Senior Year		
E. E. 41, *Electrical Engineering*	3	
M. E. 63, *Engineering Materials*	3	
M. E. 41-42, *Mechanical Engineering Seminar*	1	1
M. E. 43-44, *Machine Design and Analysis*	3	3
M. E. 57-58, *Heat and Power Systems*	4	4
M. E. (65), *Engineering Economy*		3
Approved Social-Humanistic Elective	3	3
§Technical Elective	3	3
	20	17

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 21-22-23 sequence will normally enroll in Math. 27 in lieu of a technical elective during the junior year.

§ Technical Elective courses must be approved by the Department.

TECHNOLOGY CURRICULUM IN PHYSICS

Freshman Year	*First Semester Credits*	*Second Semester Credits*
P. E. 31, 32	½	½
*R.O.T.C.	( )	( )
Engl. 1-2, *Freshman English*	3	3
Chem. 3-4, *General Chemistry*	4	4
†Math. 21-22, *Calculus B1 and B2* or Math. 25-26, *Calculus A1 and A2*	5	5
Phys. 18, *General Physics I*		4
Non-Technical Elective	3	
	15½	16½
Sophomore Year		
*R.O.T.C.	( )	( )
‡Math. 23, *Calculus B3*	5	
‡Math. 24, *Differential Equations*		3
Phys. 23-24, *General Physics II and III*	4	4
Ger. 1-2, *German*	3	3
Non-Technical Elective	3	6
	15	16
Junior Year		
Math. 51-52, *Advanced Calculus*	3	3
Phys. 31-32, *Physical Mechanics*	4	4
Phys. 34, *Electricity and Magnetism*		4
Phys. 35-36, *Experimental Physics I and II*	3	2
Phys. 37, *Modern Physics*	3	
Non-Technical Elective	3	3
§Technical Elective	3	3
	19	19
Senior Year		
Phys. 91, 92, *Atomic Physics, Nuclear Physics*	4	4
‖Phys. 93, 94, *Theoretical Physics I and II*	5	5
Phys. 95-96, *Experimental Physics III and IV*	3	3
Non-Technical Elective	3	3
§Technical Elective	3	3
Phys. 97, 98, *Colloquium*	1	1
	19	19

* All male freshman and sophomore students must enroll in either Air Science or Military Science, which will add a total of six credits to these years.

† Sequence will be assigned on the basis of mathematics entrance examination.

‡ Students in the Math. 25-26 sequence may enroll in Math. 24 in either semester and will substitute a technical elective for Math. 23.

§ Phys. 81, Physical Optics, Phys. 82, Thermodynamics, or other approved elective. Those interested in experimental physics are advised to elect a sequence of electronic courses in Electrical Engineering.

‖ Phys. 81 and Phys. 82 may be substituted for Phys. 93-94 with the permission of the Department.

The Graduate School

The Graduate School, which has offered instruction since 1903, has for its objective the bringing together of faculty and qualified students in a spirit of scholarship and research. The graduate student is given opportunity to specialize in some field of knowledge, and to develop a maturity of thought and attitude toward his professional field, so that both his professional and his cultural life are enhanced. The work of the Graduate School is under the general direction of the Graduate Faculty. The Dean of the Graduate School is responsible for the administration of the regulations and requirements pertaining to admission, conduct of work, the granting of advanced degrees, and other pertinent matters.

Degrees

Graduate programs are offered in the following disciplines: Agricultural Economics, Agricultural Education, Agronomy, Animal Science, Biochemistry, Botany, Chemical Engineering, Chemistry, Civil Engineering, Dairy Science, Electrical Engineering, Entomology, Forestry, Home Economics, Horticulture, Mathematics, Mechanical Engineering, Microbiology, Physics, Poultry Science, and Zoology leading to the Master of Science degree; Economics, English, Government, History, Language, Psychology, and Sociology leading to the Master of Arts degree; and Education leading to the Master of Education degree. Programs also are available leading to the Master of Agricultural Education degree and to the Master of Science for Teachers degree. Graduate programs leading to the Doctor of Philosophy degree are offered in the Departments of Botany, Chemistry, Horticulture, Microbiology, Physics, and Zoology.

Assistantships, Scholarships, and Fellowships

Graduate assistantships are available in several departments. These involve work in research, teaching, general service, or some combination thereof. Scholarships are also available which provide exemption of tuition charges. A limited number of fellowships provided by the National Defense Education Act of 1958 are available in Botany and Zoology.

Information

Detailed information about admission, requirements for degrees, courses, fellowships, scholarships, and assistantships are to be found in the Graduate School catalogue which may be obtained by writing to the Dean of the Graduate School.

Description of Courses

EXPLANATION OF ARRANGEMENT

The title of the course is given in small capital letters; the arabic numerial designates the particular course. Odd numerals indicate courses normally offered in the first semester; even numerals indicate courses normally offered in the second semester. Arabic numerals enclosed in parentheses indicate that course is repeated in the semester following. Thus course 1 (1) is offered in the first semester and is repeated in the second semester.

Every course is assigned to one of 24 examination groups. As all courses in the same examination group have their final examination at the same time, a student may not register for two courses with the same examination number. Courses with examination group number 0 have no final examination, so that more than one course in this group may be scheduled by a student. For the examination group number of each course, see the time and room schedule.

Courses numbered 1-50 cannot normally be counted for graduate credit. Courses numbered 51-99 are for juniors, seniors, and graduate students. They are not open to freshman and sophomores. Descriptions of courses over 100, which are for graduate students only, will be found in the Graduate School catalogue.

Following the title is the course description and the name of the instructor. The next section gives the following information in the order indicated: (1) prerequisites, if any; (2) the number of hours of recitations or laboratory periods required each week; (3) the number of semester credits the course will count in the total required for graduation. Lectures and recitations are normally fifty minutes in length. Laboratory periods are usually two and one-half hours in length.

Abbreviations have been employed to indicate the number of hours of work required of students in lecture, recitation, and laboratory, and the number of credits given for satisfactory completion of each course. The abbreviations should be interpreted as follows.

Cr.	Semester hour credit
Lab.	Laboratory
Lec.	Lecture
Prereq.	Prerequisites
Rec.	Recitation

All courses (unless otherwise marked) are open to students who have passed the prerequisites.

An elective course may be given only when there is a minimum of five students registered.

If the numerals designating a course running through both semesters are connected by a hyphen, the first semester, or its equivalent, is a prerequisite to the second semester. If the numerals are separated by a comma, properly qualified students may take the second semester without having had the first.

Students must register for the number of credits or within the range of credits shown in the catalogue description of a course.

ACCOUNTING

(See Economics and Business Administration)

AGRICULTURE

A grouping of non-departmental courses

Dean's Office, College of Agriculture

1. Introduction to College. A non-departmental course offering matters not ordinarily reviewed in other courses of instruction. Attention will be given to selected student rules and regulations, scholarships, campus organizations and facilities, opportunities in agriculture as a science, and to programs of study. Also, federal aid as related to land-grant colleges and universities will be discussed. Mr. Richards. Required of first-semester freshmen in Agriculture, Forestry, and Home Economics. 1 lec.; 1 cr.

Cooperative Extension Service

3. Principles of the Cooperative Extension Service. This course deals with the history, objectives, purposes, and philosophy of extension work; the organization, program development, and operation of Extension Services; the process of evaluating and financing; relationships between the extension service and various levels of government; the universities of which extension services are a part, and other adult education organizations, as well as the clientele of the Cooperative Extension Service. Mrs. Ruth Weston and other members of the Cooperative Extension staff. Open to juniors and seniors in Agriculture and Home Economics by permission of the instructor. 2 lec.; 2 cr. (Alternate years; offered 1962-63.)

4. Field Practice in Cooperative Extension Work. A limited number of Agriculture and Home Economics students may do supervised field practice under the direction of members of the Cooperative Extension Service staff. This practice may be done in Agriculture, Home Demonstration, or 4-H areas, or some in all three, during the second semester of the junior or senior year. Special arrangements may be made for supervised practice during the summer. Preference will be given to students who have taken Agriculture 3. Mrs. Weston. 2 to 6 cr.

Agricultural Education

89-90. Methods of Teaching Farm Mechanics in Vocational Agriculture. The organization and presentation of farm mechanics subject matter, supervision and direction of farm mechanics projects, and the preparation and presentation of demonstrations. The first semester deals with fundamental farm mechanics skills and the second semester with farm machinery maintenance and operational techniques of instruction. Mr. Gilman. Required of majors in Teacher Preparation curriculum. 1 lab.; 1 cr.

91-92. Problems in Teaching Vocational Agriculture. The vocational point of view, building the course of study in agriculture, providing teaching facilities, planning the lesson, and planning supervised farming programs. Future Farmers of America, young farmer program, adult farmer programs, and miscellaneous activities of the teacher of agriculture. Mr. Barton. Required of juniors or seniors in Teacher Preparation curriculum. 2 lec.; 1 lab.; 3 cr.

93, (93). Supervised Teaching in Vocational Agriculture. This course provides participating experience in teaching vocational agriculture under the guidance of a critic-teacher. The enrollee is required to assume the duties and responsibilities expected of the regular teacher of agriculture before the work for the semester is concluded. Mr. Barton. 17 cr.

AGRICULTURAL ECONOMICS

William F. Henry, *Professor;* James R. Bowring, *Professor;* Harold C. Grinnell, *Professor;* William H. Drew, *Associate Professor;* Richard A. Andrews, *Assistant Professor*

12. Economics of Agriculture. A survey of economics as related to the agricultural industry. Includes the nature of farming costs and farm prices, the economics of marketing, the economic bases of consumer decision making, and agricultural policy. Mr. Henry. 3 lec.; 3 cr.

14. Farm Management. Principles of managing farms for maximum income, including methods of making management decisions; enterprise selection and resource combination; adjustment to prices; management of land, labor, and equipment; obtaining capital; farm planning; records and analysis of performance. The principles are applied to several kinds of farms through examples, laboratory problems, and farm visits. Open to juniors and seniors. Mr. Andrews. 3 lec.; 1 lab.; 4 cr.

34. Economics of Consumption. The significance of consumer decisions about spending and saving to the economy. Budgeting and decision making in the major categories of consumer purchases. Factors influencing consumer choice, including prices, grades, and standards. Changing food needs and their relation to production and marketing problems. Problems of maximizing consumer satisfaction. Mr. Henry. Prereq.: Econ. 1. 3 lec.; 3 cr.

51. Agricultural Business. The organizational, legal, and financial aspects of businesses engaged in buying farm products and selling farm supplies. Farm cooperatives are covered as a special case. Agricultural marketing problems are integrated with the course content. Mr. Grinnell. 3 lec.; 3 cr.

54. Agricultural Finance. The capital needs of different kinds of farms and farmer organizations. Saving, credit, renting, partnerships, and other means of obtaining capital. Organization, practices, and problems of credit institutions serving agriculture. The valuation and appraisal of farm property. Mr. Andrews. Prereq.: Ag. Econ. 14 or concurrently. 2 lec.; 2 cr. (Alternate years; not offered 1962-63.)

55. Agricultural Marketing. Food processing and distribution comprise one of the world's most important industries. This course examines the marketing structure for the major food industries and the kinds of market decisions and agreements made for profit and general welfare by firms, processors, and government policy makers. Consideration is given to market development, plant location, prices, grades, and specification buying as related to the demand for food by institutional buyers, processors, and retailers. Emphasis is given to international trade in food products and the place of the surplus productive capacity of the United States in relation to world trade. Mr. Bowring. 3 lec.; 3 cr.

61. Agricultural Policy. The course is designed to give non-major students a broad understanding of the various economic problems associated with agriculture in the United States and the world. The general topics covered are: history of agricultural policy in the United States; the

world food situation; the agricultural problems of underdeveloped countries; the low income — high production problems of United States agriculture; agricultural production and conservation in the United States; the goals of agricultural policy; and contemporary types of agricultural policy in the United States. Mr. Drew. 3 lec.; 3 cr.

67, 68. Special Problems. Special assignments in reading and problems to satisfy students' needs. Mr. Henry, Mr. Bowring, Mr. Grinnell, Mr. Drew, and Mr. Andrews. Prereq.: special permission. 1 to 3 cr.

72. Research Methodology. The scientific method of research for advanced students. Emphasis will be placed on the meaning of logic and the scientific method and on the application of research techniques to identifying and solving problems of agriculture. Prereq.: 3 hours of statistics. Mr. Drew. 3 lec.; 3 cr.

AGRICULTURAL ENGINEERING

John J. Kolega, *Associate Professor;* Gordon L. Byers, *Associate Professor;* Paul A. Gilman, *Associate Professor of Farm Mechanics, Thompson School of Agriculture*

2. Residence Planning. The considerations involved in building or buying a house to fit one's needs. Problems in selecting and applying typical materials to residence construction. Mr. Kolega. 1 lec.; 1 lab.; 2 cr.

18. Fabrication Technology. An introductory study of the nature of metals and plastics used in agriculture which deal specifically with heating, welding, forming, and repairing. Lectures, demonstrations, and laboratory practices are provided. Mr. Gilman. 1 lec.; 2 lab.; 3 cr.

21. Soil and Water Control. Elementary surveying and its application to agricultural problems. The design principles, mapping, and layout of drainage, erosion control, and irrigation systems along with the presentation of construction practices for farm ponds, diversion ditches, terraces, and other mechanical methods of water control. Farmstead water systems and pumps are included. Mr. Kolega. 2 lec.; 1 lab.; 3 cr.

22. Agricultural Power, Tractors, tractor engines, and electrical energy in farm work. The factors involved in the management, preventive maintenance, and repair procedures required by tractor motors and their power transmission systems. Mr. Byers. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

23. Agricultural Machinery. The selection, care, operation, and management of conventional farm machinery and processing equipment involved in the production of farm commodities. Mr. Byers. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

24. Agricultural Buildings. The planning and design of agricultural structures for animals and crops. Construction practices, farmstead layout, building material selection and application, material estimates, heating systems, lighting, refrigeration, sewage disposal, ventilation, environmental controls, certain phases of crop processing, and basic concepts of architectural drafting are introduced. An agricultural building problem, related to the student's major or field of interest, serves as the base for the application of all principles presented in lecture. Mr. Kolega. 2 lec.; 1 lab.; 3 cr.

Note: Courses 31 through 40 are primarily for Agricultural Engineering majors and Technology students.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

31. Soil and Water Engineering. The hydrologic, soil, vegetal, and stream flow factors involved in the design and operation of erosion control structures, drainage systems, and irrigation systems. Mr. Kolega. Prereq.: C.E. 52. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

32. Farm Tractors. The design and operation of farm tractors, tractor power units, chassis mechanics, tractor tests and performances. Mr. Byers. Prereq. or concurrently: M.E. 26; M.E. 33. 2 lec.; 1 lab.; 3 cr.

33. Field Machinery. The design of the engineering elements of farm machinery; capacity and power requirements of farm implements. Mr. Byers. Prereq. or concurrently: M.E. 26. 2 lec.; 1 lab.; 3 cr.

34. Agricultural Structures. The functional planning and the analysis used in farm building design; problems arising from the physiological processes of animals and crops. Mr. Kolega. Prereq. or concurrently. M.E. 35. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

35. Electric Power and Processing. The utilization of electrical energy on farms for power, illumination, and temperature control, including the study of equipment used in crop processing water systems, materials handling, and the analysis of farmstead wiring problems. Mr. Kolega. Prereq. or concurrently: E.E. 39. 2 lec.; 1 lab.; 3 cr.

61, (61). Special Problems in Agricultural Engineering. Guided but independent activities in special areas of agricultural engineering by students capable of self-direction. Prereq.: senior standing. 1-3 cr.; time to be arranged.

AGRONOMY

(Soils and Crops)

Allan B. Prince, *Professor;* Ford S. Prince, *Professor Emeritus;* Leroy J. Higgins, *Associate Professor;* Nobel K. Peterson, *Associate Professor;* Gerald M. Dunn, *Associate Professor*

Crops

1. Introductory Crop Production. The production, distribution, cultural practices, improvement, and uses of field crops, such as forage, grain, and tuber crops. Mr. Higgins. 2 lec.; 1 lab.; 3 cr.

25. Seed Testing. The identification of seeds and the techniques used in official methods of sampling and analyzing agricultural seeds for purity and germination. Mrs. Sanborn, Seed Analyst. Prereq.: Bot. 1 and permission of instructor. 1 lab.; 1 cr.

26. Production of Row and Other Annual Crops. The characteristics and fundamentals of production of row and drilled crops, with emphasis on corn, potatoes, and other cereal crops. Mr. Higgins. 2 lec.; 1 lab.; 3 cr.

(51). Pasture-Hay Crops and Turf. The grasses and legumes used as hay, pasture, and silage, and the methods used in the production of high quality forage. Consideration also will be given to turf grasses and management for lawns and turfs. Mr. Higgins. Prereq.: Permission of instructor. 3 lec.; 1 lab.; 4 cr.

62. Breeding of Field Crops. Principles and methods of breeding of grasses, legumes, and cereal crops. The genetic basis of breeding will be emphasized. Laboratory will consist of genetic problems, crossing and inheritance studies in the greenhouse, and statistical analysis of experimental plot designs. Mr. Dunn. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

11. Introductory Soils. The physical, chemical, and biological properties of soils in relation to plant growth. Mr. Peterson. 3 lec.; 1 lab.; 4 cr.

14. Introductory Soil Fertility. Soils in relation to their natural fertility, productivity, and the practices and amendments employed to maintain or increase fertility. Mr. Peterson. Prereq.: Agron. 11. 3 lec.; 3 cr.

57. Physics and Chemistry of Soil. Physical and chemical properties of soils; their measurement and relation to structure; water movement; temperature; and liberation, absorption, and fixation of elements in soils. Mr. Prince. Prereq.: Bio. Ch. 1 or Chem. 17 or their equivalent. 3 lec.; 2 lab.; 5 cr. (Alternate years; offered 1962-63.)

58. Soil Classification and Mapping. The genesis, morphology, classification, and mapping of soils. Mr. Peterson. Prereq.: Agron. 11 and Geol. 1 or 7. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

60. Soil and Water Conservation. Management of soil and water in accordance with the needs and capabilities of the land. Mr. Peterson. Prereq.: Agron. 1, 11. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered in 1962-63.)

General Courses

52. A Review of Agronomy. Principles and practices in agronomic crop production, including the management of soils and the use and response of lime and fertilizers. For teachers of Vocational Agriculture and other students with the permission of their advisers. Mr. Higgins and staff. Summer Session only—not offered in 1962. Two hours daily, lec. and lab.; 2 cr.

71, 72. Agronomy Seminar. Library and reference work on special phases of soil and crop problems. Practice in looking up literature and in preparation and presentation of reports and abstracts. Staff. Required each semester of seniors and graduate students majoring in Agronomy; elective for other qualified students. 1 cr.

75, 76. Investigations In:

a. Crop Production — Mr. Higgins
b. Plant Breeding — Mr. Dunn
c. Physics and Chemistry of Soil — Mr. Prince
d. Soil Fertility — Mr. Peterson

Elective only after consultation with the instructor in charge. Hours to be arranged. 1-4 credits.

ANIMAL SCIENCE

Loring V. Tirrell, *Professor;* Fred E. Allen, *Professor;* Gerald L. Smith, *Associate Professor;* Harold E. Kimball, *Riding Instructor*

2. Types and Market Classes of Livestock. Origin, history, development, characteristics, and adaptability of the different types of horses, cattle, sheep, and swine, with practice in judging. Mr. Tirrell and Mr. Smith. 2 lec.; 1 lab.; 3 cr.

11. Livestock Judging. The principles and practice of judging horses, beef cattle, sheep, and swine. It includes trips to some of the best New England breeding establishments and is required of candidates for judging teams. Mr. Smith. 1 lab.; 1 cr.

13. Feeds and Feeding. The character, composition, and digestibility of feed stuffs and the principles and methods of feeding different kinds of farm animals. Mr. Smith. 3 lec.; 3 cr.

14. Advanced Livestock Judging. A continuation of Animal Science 11. It serves as a basis for the selection of a livestock team for competition such as held at the Eastern States Exposition and the International Livestock Exposition at Chicago. Mr. Smith. Prereq.: An. Sci. 11. 1 lab.; 1 cr.

15. Systematic Anatomy. The general anatomy and physiology of domestic animals. Mr. Allen. 3 lec.; 3 cr.

16. Animal Diseases. The prevention, control, and treatment of the bacterial and parasitic diseases of domestic animals. Mr. Allen. Prereq.: An. Sci. 15. 3 lec.; 3 cr.

18. Meat and Its Products; Livestock Markets. Meat, farm slaughter, curing, and indentification of cuts, livestock markets, stockyards, and transportation, with occasional trips to slaughter houses and packing plants. Mr. Smith. 1 lec.; 1 lab.; 2 cr.

19. Management of Beef Cattle and Swine. Selection, feeding, breeding, management, and preparation for the show ring of beef cattle and swine with special reference to New England conditions. Mr. Tirrell and Mr. Smith. 2 lec.; 1 lab.; 3 cr.

20. Sheep Husbandry. Selection, breeding, feeding, management, and preparation for the show ring of sheep, with special reference to New England conditions. Mr. Tirrell and Mr. Smith. 2 lec.; 1 lab.; 3 cr.

21. Light Horse Husbandry. Origin, history, development, judging, selection, feeding, breeding, and management of light horses. Special emphasis will be placed upon saddle-horse selection, the show ring classes, and judging. Horse show management will be discussed. Mr. Tirrell and Mr. Kimball. 1 lec.; 1 lab.; 2 cr.

23, (23). Horsemanship. Instruction in riding using University-owned Morgans under supervision of a special riding instructor. It may be possible for a limited number of students to stable their horses at the University upon proper authorization. Any student wishing to use this course to satisfy an activity requirement in Physical Education for Women will register for Physical Education 1, 2, 3, 4, 5 or 6. Two one-hour or one two-hour riding periods per week for which a fee of $35 per quarter is charged. Mr. Kimball. 1 cr.

51. Animal Breeding. The principles and practices of breeding farm animals, including cross-breeding, in-breeding, selection, inheritance, breed analysis, reproductive efficiency, fertility and sterility. Mr. Smith. 3 lec.; 3 cr.

52. Animal Science Seminar. Library and reference work and preparation of papers on various Animal Science subjects. Mr. Tirrell. 1 to 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

GEORGE R. THOMAS, *Professor;* JOHN W. HATCH, *Associate Professor;* MARGUERITE ABBOTT, *Associate Professor;* RICHARD D. MERRITT, *Assistant Professor;* JOHN LAURENT, *Assistant Professor:* WINIFRED CLARK, *Assistant Professor;* JAMES A. FASANELLI, *Assistant Professor;* R. VIRGINIA BELL, *Instructor;* CHRISTOPHER C. COOK, *Instructor;* DANIEL L. VALENZA, *Instructor;* ALFRED R. POTTER, *Instructor;* JACQUELINE CASALE, *Visiting Instructor;* JOSEPH CASALE, *Visiting Instructor;* HUGH PRITCHARD, *Visiting Lecturer*

VISITING LECTURERS IN OCCUPATIONAL THERAPY

WILLIAM AMMAN, M.D., *Ophthalmology and Otology;* ARTHUR DI MAMBRO, M.D., *Orthopedics;* CHARLES H. HOWARTH, *B.S., M.D., General Medicine and Surgery, Chest Conditions;* GERHARD NOTHMANN, M.D., *Psychiatry;* GERALD SHATTUCK, M.D., *Pediatrics*

EXHIBITIONS AND ARTS TRIPS. The Department promotes on the campus a series of exhibitions and lectures relating to the arts. Visits to near-by museums and points of interests are arranged from time to time. The following are a few of the art centers within a convenient radius of Durham: Addison Gallery of American Art, Currier Gallery of Art, Lamont Gallery, and several excellent museums and galleries in Boston, including the Boston Museum of Fine Arts, the Gardner Museum, the Fogg Museum at Harvard University, and the Institute of Contemporary Art.

STUDENT WORKSHOP. An experimental arts laboratory located in Hewitt Hall, is open to any student in the University, whether or not enrolled in art courses. This laboratory provides an excellent environment in which a student may explore materials, plan, and execute projects of his own choice. Excellent facilities, including equipment ranging from small craft tools to industrial type machines, are provided. Mr. Valenza.

GENERAL COURSES IN THE ARTS

In those courses where the students retain finished products, they pay the costs of materials and supplies used. The Department of The Arts reserves the right to retain for exhibition purposes several examples of each student's work in each class of instruction.

Students are responsible for the care of shops, studios, and all equipment therein; damage resulting through negligence or carelessness will be the responsibility of the student. Tools and other equipment will not be used until instruction in their use is given by the member of the staff in charge.

Unless otherwise authorized by the Chairman of the Department, projects not a part of the instructional program will be excluded from the studios.

3. CRAFTS. Work in leather, metal tooling, chip carving, and other crafts which require little special equipment and which may be carried on in elementary and secondary schools. Problems in design, methods of teaching each craft, sources of materials and tools, and current literature. Miss Clark. *For Art-Education students;* also, elective by permission. 2 lab.; 2 cr.

4. CRAFTS. Craft activities for summer camps, playgrounds, settlement and scout groups. Design and construction in leather, paper, wood, textiles, scrap, and native materials. Special emphasis on methods of teaching and

using crafts in camp handcraft programs, sources of materials and tools, and current literature. Miss Clark. *For Recreation Education, Physical Education, and Social Service students;* also, elective by permission. 2 lab.; 2 cr.

5, (5). Jewelry and Metalwork. Structural and decorative design and construction in various metals, such as pewter, copper, and silver. This course may be repeated, in which case advanced projects will be assigned. *This course may be taken for credit no more than four times.* Miss Clark. Elective by permission. 2 lab.; 2 cr.

(6). Weaving. Fundamentals of weaving: warping, threading, basic weaves, patterns. Projects include place mats, scarves, bags, rugs, etc. This course may be repeated , in which case advanced projects will be assigned. *This course may be taken for credit no more than four times.* Miss Clark. Elective by permission. 2 lab.; 2 cr.

(8). Textile Design. Creative design in stenciling, block printing, silk screen printing. This course may be repeated, in which case advanced projects will be assigned. *This course may be taken for credit no more than four times.* Miss Clark. Elective by permission. 2 lab.; 2 cr.

11, (11). Sculpture. An introduction to three dimensional expressive form. Studio work in various sculpture materials (clay, wood, metal, plaster) including exploration of the processes of modeling, carving, casting, welding, firing, and glazing. This course may be repeated, in which case advanced projects will be assigned. *This course may be taken for credit no more than three times.* Mr. Potter. Elective by permission. 2 lab.; 2 cr.

15, 16. Ceramics. Design and construction of three dimensional forms, with emphasis upon coil and slab built functional and non-functional pottery. Studio practice in clay preparation, glazing, and kiln firing. Directed glaze and glaze material experiments. Kiln procedures are explained and the student is expected to participate in stacking and firing. Group demonstrations and individual instruction. Mr. Potter. Elective by permission. 2 lab.; 2 cr.

17, 18. Ceramics. Exploration of three dimensional forms in clay, with emphasis upon wheel-thrown functional and non-functional pottery. Studio practice in clay preparation, glazing, and kiln firing. Directed glaze and glaze material experiments. Kiln procedures are explained and the student is expected to participate in stacking and firing. Group demonstrations and individual instruction. Advanced students may be assigned individual problems. Mr. Potter. Elective by permission. 2 lab.; 2 cr.

20. Drafting and Space Planning. Basic drafting procedures, including lettering. Study of architectural symbols and interpretation of architectural plans. Introduction to problems of architectural design, with emphasis on those relating to the hotel industry. Assigned problems in space utilization and space planning. Mr. Thomas. *For Hotel Administration students, elective by permission only.* 1 lec.; 2 lab.; 3 cr.

23, (23). Basic Design. A basic course in the structural and expressive use of the elements of design as a background for crafts, ceramics, sculpture, drawing and painting, advertising design and illustration. A series of related lectures and demonstrations will be scheduled throughout the semester. Miss Clark, Mr. Hatch, Mr. Laurent and Mr. Cook. Elective by permission. 1 lec.; 2 lab.; 2 cr.

24. Drawing and Design. A continuation of Arts 23 with problems in three dimensional design and drawing from the model and from nature. Mr. Hatch, Mr. Laurent and Mr. Cook. Prereq.: Arts 23 and permission. 2 lab.; 2 cr.

25, 26. Advanced Drawing and Painting. Drawing is concentrated in the fall semester; extensive drawing in studio and from nature, still life and figure drawing in a variety of media, i.e., pencil, pen, ink and wash, pastel, and watercolor. An introduction to oil painting composition, means of form description, and theories of color are presented in studio exercises and outdoor sketching in the spring semester. Mr. Hatch, Mr. Laurent and Mr. Cook. Elective by permission only. 2 lab.; 3 cr.

(27). Graphic Arts. Expression and experimentation in a variety of graphic techniques, i.e., linoleum and wood block printing, etching, lithography, serigraphy, etc., in black and white and color. Mr. Laurent. Elective by permission only. 2 lab.; 3 cr.

(28). Advertising Design. Creative design problems in various media and techniques in an introduction to the field of advertising design. Mr. Hatch. Elective by permission only. 2 lab.; 2 cr.

29, 30. Advanced Painting and Composition. An extension of Arts 25 and 26, stressing further development in the various media. Figure study and outdoor sketching also will be included. This course may be taken a second time with emphasis on the particular need of the individual. Mr. Laurent. Elective by permission only. Credits and schedule to be arranged.

31, 32. Introduction to The Arts. A broad historical survey of man's creative efforts in their relation to contemporary cultural and social movements, presented as a background for interpreting the place of the arts in individual and community life of today. Illustrated lectures with assigned readings. Mr. Thomas and Mr. Fasanelli. *Not open to freshmen.* 3 lec.; 3 cr.

(38). Illustration. Creative design problems in various media and techniques in an introduction to the field of illustration. Elective by permission only. 2 lab.; 2 cr. (Alternate years; not offered 1962-63.)

39, (39). Elementary Photography. The theory and practice of photography, covering camera operation, developing, printing, and enlarging. Imaginative solutions are sought to projects designed to increase the students' perception. Mr. Merritt. Not open to freshmen. Elective by permission only. 1 lec.; 1 lab.; 3 cr. (The supply fee will approximate $8.00.)

40. Advanced Photography. The basic theory and practice of color photography. Advanced projects in black and white. Techniques of creative photography including studio and laboratory controls. A portfolio of photographs, representative of the student's progress during the course, will be required. Mr. Merritt. Permission of the instructor. 1 lec.; 1 lab.; 3 cr. (The supply fee will approximate $10.50.) (Alternate years; not offered 1962-63.)

83. Primitive, Oriental, and Classic Art. Primitive art from prehistoric caves to Egypt, also Mayan, Negro, and modern primitive arts in general; the development of art in the Far East, especially China and Japan; the development and decline of the classic art of Greece and Rome. The motivation, the relationship to the particular culture, and the influence on modern art of these various art epochs will be stressed. Illustrated lectures with assigned readings. Mr. Hatch. 3 lec.; 3 cr.

85. The Art of the Renaissance. A historic survey of the achievements of Western civilization in sculpture, painting, and architecture from the Gothic cathedral to the 18th century drawing room. Illustrated lectures with assigned readings. Mr. Fasanelli. 3 lec.; 3 cr.

88. Modern Art. From Louis XVI to Picasso; traces the history of painting through the various revolutions, political and aesthetic, that resulted in the many schools of thought prevalent in 19th and 20th century art; i.e., classicism, impressionism, cubism, etc. Illustrated lectures with assigned readings. Mr. Fasanelli. 3 lec.; 3 cr.

99, (99). Problems in the Visual Arts. Advanced students may select a special problem in one of the visual arts in which they have exhibited proficiency, to be developed by means of conferences and studio work. Mr. Thomas and staff. Prereq.: Permission of Department Chairman. Credits to be arranged. *This course may be repeated to a total of not more than 6 credits.*

Art-Education (Art-Ed.) 91. Problems of Teaching Art in Elementary Schools. The purposes and objectives of teaching art in elementary schools; selection and organization of teaching material; teaching techniques which may be advantageously employed in the elementary schools. Mr. Thomas. Open only to students in the Art-Education curriculum. Prereq.: Educ. 58 with grade of C or better. 2 lec.; 1 lab.; 3 cr.

Art-Eduaction (Art-Ed.) (92). Problems of Teaching Art in Secondary Schools. The purpose and objectives of teaching art in the secondary schools; selection and organization of teaching materials; teaching techniques which may be advantageously employed in the secondary-school art program. Mr. Thomas. Open only to students in the Art-Education curriculum. Prereq.: Educ. 58 with a grade of C or better. 2 lec.; 1 lab.; 3 cr.

Education-Art (Ed-Art) 94. Supervised Teaching in Art. Prereq.: Art-Ed. 92. One semester of supervised teaching. 14 cr.

Selection from the following courses offered by several departments within the University may, with the consent of the Chairman of the Department, be counted toward a major program in The Arts.

Costume Design. *See* Home Economics

Floral Arrangement. *See* Horticulture

Fundamentals of Fashion. *See* Home Economics.

History of Costume. *See* Home Economics

Interior Design. *See* Home Economics

Interior Decoration. *See* Home Economics

Principles of Clothing Construction and Design. *See* Home Economics

Textiles. *See* Home Economics

Textiles and Furniture. *See* Home Economics

For courses in music, dramatic art, and dancing, see departments of Music, Speech and Drama, and Physical Education for Women.

Occupational Therapy

These courses are for students in the Occupational Therapy curriculum; elective for others by permission of the Department Chairman.

Register for the following courses as O.T. 1, etc.

1. Crafts. Instruction in bookbinding, stenciling, silk screening, sewing, embroidery, knitting and crocheting, emphasizing the therapeutic application of these modaltities. Miss Bell. 2 lab.; 2 cr.

2. Crafts. Seat weaving, basketry, chip carving, fly tying, and leatherwork. The therapeutic application of these crafts is stressed. Miss Bell. 3 lab.; 3 cr.

(5). Jewelry and Metalwork. Instruction in design and construction, using copper, silver, and pewter. Etching, tooling, casting, enameling and stone setting. Miss Clark. 3 lab.; 3 cr.

(6). Weaving. Card weaving, small frame weaving, and hand and foot-powered loom weaving applied to ocupational therapy. Miss Bell. 3 lab.; 3 cr.

7-8. Elementary Processes in Wood and Plastics. The design and construction of wood and plastic objects, including the nature and properties of these materials and the processes of cutting, shaping, fitting, and finishing. Practice and demonstrations cover the operation of hand and power tools, safety precautions, the making of adaptive equipment, and other problems of shop management to be encountered in occupational therapy. Mr. Valenza. 1 lec.; 2 lab.; 2 cr.

(10.) Lettering and Printing. Instruction in various styles of lettering with pen, and with brush; poster design; operation of hand and pedal manipulated presses with elementary layout, composition with type, and proofreading. Survey and history of lettering and print methods. Miss Bell. 1 lec.; 2 lab.; 2 cr.

15-16. Ceramics and Modeling. Design and construction. Methods of preparing and working clay, and uses of pottery equipment best suited to application in occupational therapy work. Mr. Potter. 1 lec.; 2 lab.; 2 cr.

41. Application of Occupational Therapy. Orientation of occupational therapy and its functions as a profession. Instruction trips to hospitals and treatment centers. Miss Abbott. 2 lec.; 2 cr.

42. Application of Occupational Therapy. Application of the principles of ocupational therapy to general medical and surgical conditions, cardiac conditions, sensory disturbances and tuberculosis. Special problems encountered with pediatric and geriatric patients. Prereq.: O.T. 41, Psych. 37, (O.T. (49) to be taken concurrently.) Miss Abbott and Miss Bell. 2 lec.; 2 cr.

(44). Application of Occupational Therapy. Application of the principles of occupational therapy to psychiatric conditions, the organization and administration of a hospital and an occupational therapy department. Instruction trips to hospitals and treatment centers. Prereq.: O.T. 42 and Psych. 54. (O.T. (50) to be taken concurrently.) Miss Abbott. 2 lec.; 2 cr.

46. Application of Occupational Therapy. Application of occupational therapy techniques used in treating patients with physical disabilities. Cerebral palsy, poliomyelitis, and the degenerative neurological conditions. Instruction trips to hospitals and treatment centers. Prereq.: O. T. 42, O. T. (49), (50). Miss Abbott. 2 lec.; 1 lab.; 3 cr.

(49), (50). Clinical Subjects. Basic information concerning the etiology, pathology, symptoms, and treatments of disease. Visiting specialists lecture on general medicine and surgery, psychiatry, orthopedics, pediatrics, ophthalmology, and otology. Medical staff. Prereq.: Zool. 17-18. O. T. 42, Psych. 54. One 2-hr. lec.; 1 lec. or instruction trip; 2 cr.

92A. Clinical Affiliation in General Medicine and Surgery. One or two months full time. No credit.

92B. Clinical Affiliation in Pediatrics. One or two months full time. No credit.

92C. Clinical Affiliation in Psychiatry. Three or four months full time. No. credit.

92E. Clinical Affiliation in Physical Disabilities. Two or three months full time. No credit.

BIOCHEMISTRY

ARTHUR E. TEERI, *Professor;* THOMAS G. PHILLIPS, *Professor Emeritus;* STANLEY R. SHIMER, *Professor;* MARGARET E. LOUGHLIN, *Assistant Professor;* DOUGLAS G. ROUTLEY, *Assistant Professor*

1. ORGANIC AND BIOLOGICAL CHEMISTRY. An introduction to organic chemistry and a brief survey of biological chemistry. Mr. Shimer, Miss Loughlin. Prereq.: Chem. 2 or 4. 3 lec.; 2 lab.; 5 cr.

2. PLANT CHEMISTRY. The chemistry of plant growth. Mr. Routley. Prereq.: Bio.Ch. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr.

4. ANIMAL NUTRITION. The chemistry of animal nutrition. Mr. Shimer. Prereq.: Bio.Ch. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr.

6. CHEMISTRY OF FOOD AND NUTRITION. The chemistry of food materials and of digestion, absorption, metabolism, and excretion. Prereq. Bio.Ch. 1 or its equivalent. 2 lec.; 1 lab.; 3 cr.

51-52. GENERAL BIOCHEMISTRY. The chemistry of fats, carbohydrates, and proteins; colloids, enzymes, digestion, metabolism, and excretion. Mr. Shimer, Mr. Teeri. Prereq.: Satisfactory preparation in organic chemistry and quantitative analysis. 3 lec.; 2 lab.; 5 cr. Under special conditions a graduate student may register for the lectures in this course (3 cr.) after obtaining the consent of the instructor and approval of his adviser.

56. PHYSIOLOGICAL CHEMISTRY. The qualitative and quantitative methods fundamental to medical diagnostic work. The chemistry of fats, carbohydrates, and proteins; enzymes, digestion, metabolism, and excretion. Mr. Teeri. Prereq.: Satisfactory preparation in organic chemistry and quantitative analysis. 3 lec.; 2 lab.; 5 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

BIOLOGY

1-2. MAN AND THE LIVING WORLD. A basic course in biology, designed to give the student fundamental facts about himself and an understanding of his relation to the living world, both plant and animal, of which he is a part. 2 lec.; 1 lab.; 3 cr. *This course cannot be used to satisfy majors requirements.* (Bot. 1 may be used as a prerequisite for Biol. 2.)

3. MAN AND THE LIVING WORLD. An advanced-standing course open to freshmen and sophomores who have had good background in high school biology and elementary physical sciences. During the first week of classes, a placement test covering these areas will be given to all students registering for Biology 1. Students wishing to enroll in Biology 3 may so indicate when they take the placement test.
Admission to Biology 3 will have the effect of waiving three hours of the six credit hours required in the biological sciences. Further information concerning admission to this course can be obtained from Mr. George M. Moore. 2 lec.; 1 lab.; 3 cr.

61-62. CLINICAL LABORATORY METHODS. An 11-month course in medical technology taken at the Mary Hitchcock Memorial Hospital School of Medical Technology, Hanover, New Hampshire. This course starts about June 20, and includes lectures and laboratory work in bacteriology, blood bank and serology, clinical chemistry, hematology, laboratory management and ethics, mycology, parasitology, histology, and clinical microscopy.

Credits will be allowed when the University has received a transcript of the candidate's record and upon certification by the Director of the School and the Supervisor of the Medical Technology curriculum that the work has been successfully completed. This course qualifies a candidate for the examination for the Medical Technologist's Certificate administered by the Registry of Medical Technologists of the American Society of Clinical Pathologists. 32 cr. *This course cannot be taken for graduate credit.*

Biology-Education (Biol-Ed.) 91. Problems in the Teaching of High-School Biology. Objectives and methods of teaching. The selection and organization of materials; the preparation of visual aids; the setting up of aquaria and other projects. The use of the field trip as a tool in teaching high-school biology. Mr. Schaefer. Prereq.; Two years of biological science and Educ. 58 with a grade of C or better. 2 lec.; 1 lab.; 3 cr.

Education-Biology (Ed-Biol.) 93, 94. Supervised Teaching in High-School Biology. (See description under Education.)

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

BOTANY

Albion R. Hodgdon, *Professor;* M. C. Richards, *Professor;* Avery E. Rich, *Professor;* John F. Reed, *Professor;* Stuart Dunn, *Professor;* Charlotte G. Nast, *Associate Professor;* Marion E. Mills, *Assistant Professor Emerita;* Richard Schreiber, *Assistant Professor*

1. General Botany. An introduction to plant science. The evolution of structure and function in the plant kingdom. Elective as a prerequisite for Biol. 2; required as a prerequisite for Zool. 48. Mr. Schreiber. 3 lec.; 1 lab.; 4 cr.

3. The Plant World. A survey of the plant kingdom from an evolutionary point of view. The structure and function of plant parts. Students who have had Bot. 1 may not elect this course. Miss Nast. Prereq.: Biol. 1-2. 2 lec.; 2 lab.; 4 cr.

6. Systematic Botany. The identification and classification of our native trees, shrubs and wild flowers. Mr. Hodgdon. Prereq.: Biol. 1-2 or Bot. 1. 1 lec.; 2 lab.; 3 cr.

42. Plant Ecology. Plant life and its environment, including a consideration of the principal environment factors, such as light, temperature, soil, water, and biotic relations; study of associations, successions, and plant forms; a survey of plant distribution and underlying causes. Mr. Hodgdon. Prereq.: Bot. 1 or Bot. 3. 3 cr.

51. Plant Pathology. The nature of disease in plants, the etiology, symptomatology, and classification of plant diseases. Mr. Rich. Prereq.: Bot. 1 or Bot. 3. 1 lec.; 2 lab.; 3 cr.

52. Principles of Plant Disease Control. Exclusion, eradication, protection, and immunization, and the specific, practical methods used to control plant diseases. Mr. Rich. Prereq.: Bot. 51. 1 lec.; 2 lab.; 3 cr. (Alternate years; not offered 1962-63.)

53. Plant Anatomy. The anatomy of vascular plants with special emphasis upon tissue development and structure. Miss Nast. Prereq.: Bot. 1 or Bot. 3. 1 lec.; 2 lab.; 3 cr.

54. Cytology. The structure, physiological behavior, and development of cells. The cellular basis of heredity. Mr. Schreiber. Prereq.: a year each in the biological sciences and in chemistry. 3 lec.; 3 cr.

55. Advanced Systematic Botany. The principles and laws of plant classification and nomenclature: study of plant families, field and herbarium work. Mr. Hodgdon. Prereq.: Bot. 6. Hours to be arranged. 3 cr.

56. Plant Physiology. Structure and properties of cells, tissues, and organs; absorption and movement of water; metabolism; growth and irritability. Mr. Dunn. Prereq.: Bot. 1 or Bot. 3, and one year of chemistry. 2 lec.; 2 lab.; 4 cr.

57, 58. Investigations In: a. Systematic Botany — Mr. Hodgdon. b. Plant Physiology — Mr. Dunn. c. Plant Pathology — Mr. Rich. d. Plant Anatomy, and Morphology — Miss Nast. e. Plant Ecology — Mr. Hodgdon and Mr. Reed. f. Aquatic Plants — Mr. Hodgdon. g. Cytology —Mr. Schreiber.

Elective only after consultation with the instructor in charge. Hours to be arranged. 2 to 6 credits.

59, 60. Botany Seminar. Library and reference work and the preparation of papers and abstracts on special phases of botany. Practice in the preparation of oral and written reports. Botany staff. Prereq.: Six hours of botany or permission of the Chairman of the Department. This course may be repeated for credit. 1 lec.; 1 cr.

62. Morphology of the Vascular Plants. The life histories of the extinct and living Pteridophytes, Gymnosperms, and Angiosperms, including comparisons of general structure and sexual organs. Miss Nast. Prereq.: Bot. 1 or Bot. 3. 2 lec.; 2 lab.; 4 cr. (Alternate years; offered 1962-63.)

64. Microtechnique. A methods course in embedding, sectioning, and staining plant tissues, and introduction to photomicrography. Miss Nast. Prereq.: Bot. 1 or Bot. 3. 3 cr. (Alternate years; not offered 1962-63.)

68. Mycology. Studies of the parasitic and saprophytic fungi, their growth, reproduction, and identification. Mr. Richards. 1 lec.; 2 lab.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

BUSINESS ADMINISTRATION

(See Whittemore School of Business and Economics)

CHEMICAL ENGINEERING

Oswald T. Zimmerman, *Professor;* Irvin Lavine, *Professor;* Lewis G. Neal, *Assistant Professor*

42. Chemical Engineering Principles I. Systems of units, and dimensional analysis; material and energy balances; heats of reaction; chemical equilibria, introduction to fluid flow and heat transfer; introduction to thermodynamics, including the classical laws and their application to flow and non-flow processes. Mr. Lavine. 3 lec.; 3 cr.

51. Chemical Engineering Principles II. Transport phenomenon and stage operations. The equations of change as a basis for the study of molecular and turbulent transport of momentum, energy and mass, with emphasis upon the relation between the transport mechanism and the mathematical expression. Design principles and procedures for stagewise operations in various co-current and counter-current arrangements, based upon the ideal stage concept. Problems in both steady state and non-steady state operations. Mr. Lavine. 3 lec.; 1 lab.; 4 cr.

52. Chemical Engineering Principles III. Analysis of unit operations. Study of chemical engineering systems, with emphasis on the unit operations involved. Extension of previous studies of unit operations, and treatment of operations not previously considered. Mr. Neal. 3 lec.; 1 lab.; 4 cr.

54. Chemical Engineering Principles IV. Chemical kinetics, catalysis, and introduction to reactor design. Study of types of kinetic behavior in chemical processes; prediction of reaction rates in batch and flow reactors with and without catalysis; and application to reactor design. Mr. Zimmerman. 3 lec.; 1 lab.; 4 cr.

63. Chemical Engineering Principles V. Special methods of mathematical analysis including transform methods, calculus of finite differences, and numerical techniques; and the use of analog and digital computors in the solution of chemical engineering problems. Mr. Neal. 3 lec.; 1 lab.; 4 cr.

66. Chemical Engineering Economics and Plant Design. The principles of cost engineering, including estimation of plant investment, working capital, operating costs, labor requirements, payout time, and profitability. Value of money, capitalized costs, simple and compound interest, depreciation, taxes and insurance, labor requirements, overhead, financing of chemical enterprises, design of equipment and plants for minimum cost, plant location, transportation, sales cost, equipment cost, and cost indexes. Each class selects one or more problems involving the complete design of a chemical plant. For each problem, the most desirable process must be determined, the site selected, the equipment and plant designed, calculations made for all costs, profitability and payout time, and a complete report prepared, including the drawings of equipment and plant layout. Mr. Lavine. 1 lec.; 3 lab.; 4 cr.

67. Chemical Engineering Thermodynamics. General thermodynamic relationships and their application to power generation, refrigeration, and chemical processes; chemical equilibria and equilibrium in phase-change separations; introduction to statistical mechanics, and thermodynamics of irreversible processes. Mr. Zimmerman. 3 lec.; 3 cr.

68. Physical Metallurgy. An introductory study of the nature of metals, emphasizing the quantum mechanical description of the solid state and including atomic structure, bonding, historical development of metal theories, elementary zone or band theory, and X-ray diffraction. The microscopic metal system is also considered, and thermodynamics of metallurgical processes, defects and dislocations, phase relations of pure metals and alloys, microstructure, and physical and thermal treatment of metals are discussed. Study of some non-metals is also included. Mr. Neal. 3 lec.; 1 lab.; 4 cr.

69. Chemical Engineering Project. Each student selects a research problem which he carries out independently under faculty supervision. Intensive study in both the library and the laboratory and a satisfactory report upon completion of the work are required. Staff. 3 lab.; 3 cr.

81. Process Dynamics. Study of responses of physical systems and feedback principles, and their application to design and analysis of process control systems. Mr. Zimmerman. 3 lec.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

CHEMISTRY

HAROLD A. IDDLES, *Professor;* ALBERT F. DAGGETT, *Professor;* HELMUT M. HAENDLER, *Professor;* HENRY G. KUIVILA, *Professor;* ROBERT E. LYLE, JR., *Professor;* CHARLES M. WHEELER, JR., *Associate Professor;* ALEXANDER R. AMELL, *Associate Professor;* PAUL R. JONES, *Associate Professor;* FRANK L. PILAR, *Associate Professor;* ALBERT K. SAWYER, *Assistant Professor;* GLORIA G. LYLE, *Assistant Professor;* KENNETH K. ANDERSEN, *Assistant Professor;* PAUL S. ANDERSON, *Instructor;* ROBERT C. SCHIEK, *Instructor.*

1-2. GENERAL CHEMISTRY. Elementary chemistry with lecture demonstrations and laboratory practice. Topics of interest to the professional student and of general interest are presented. For Agriculture and Home Economics students and as an elective. Mr. Andersen and assistants. 3 lec.; 1 lab.; 4 cr.

3-4. GENERAL CHEMISTRY. The fundamental laws and conceptions of chemistry, including a study of the nonmetals and metals and their compounds. The theoretical principles are illustrated by lecture demonstrations, and the applications of chemistry in the professions are explained. Mr. Sawyer, Mr. Haendler, Mr. Wheeler, Mr. Andersen, and assistants. For students who plan to take further courses in the Department of Chemistry. 2 lec.; 1 rec.; 1 lab.; 4 cr.

5-6. INORGANIC CHEMISTRY. General inorganic chemistry, including qualitative analysis. The preparation of secondary school chemistry will furnish a basis for a thorough course for Chemistry majors and others who may elect the course. Mr. Sawyer and assistants. 3 lec.; 1 rec.; 2 lab.; 6 cr.

17. QUANTITATIVE ANALYSIS. An elementary course in quantitative analysis designed for those students desiring a brief terminal course in analytical chemistry. Mr. Daggett and assistants. Prereq.; Chem. 4. 2 lec.; 2 lab.; 4 cr.

21, (21). SEMIMICRO QUALITATIVE ANALYSIS. The fundamental theories of solutions as applied to the reactions of qualitative analysis. Problem work is required. The laboratory work uses the semimicro technique and provides ample experience in the analysis of simple and complex mixtures. Mr. Haendler and assistants. Prereq.: Chem. 4. 2 lec.; 2 lab.; 4 cr.

22. QUANTITATIVE ANALYSIS. The theory and laboratory technique of the more common determinations of gravimetric and volumetric analysis. Emphasis on the solution of problems. A comprehensive study of the more common analytical methods. Mr. Daggett and assistants. Prereq.: Chem. 21. 2 lec.; 3 lab.; 5 cr.

45, (45). ORGANIC CHEMISTRY. An introductory but comprehensive study of the chemistry of carbon compounds with emphasis on the particular phases of the subject needed by students preparing to be technicians, nurses, majors in biological sciences, and others, where a brief course is desired. Mrs. Lyle. Prereq.: Chem. 3-4. (Elective for Medical Technology, Nursing, and Pre-Dental students and majors in Botany.) 3 lec.; 2 lab.; 5 cr.

47-48. ORGANIC CHEMISTRY. The principal classes of organic compounds, aliphatic and aromatic, with emphasis on class reactions and structural theory. Laboratory exercises in the preparation and purification of selected organic compounds; also the use of group reactions for the identification of organic substances in a systematic scheme of qualitative organic analysis. Mr. Jones, Mr. Andersen, and assistants: 3 lec.; 2 lab.; 5 cr.

51-52. ORGANIC CHEMISTRY. The principal classes of organic compounds, aliphatic and aromatic, with emphasis on class reactions and structural theory. Laboratory exercises in the preparation and purification of selected

organic compounds. Mr. Andersen and assistants. Prereq.: junior standing; Chem. 21. 3 lec.; 2 lab.; 5 cr.

55-56. Structural and Theoretical Problems of Modern Organic Chemistry. The methods of preparation and reactions of the principal classes of organic compounds. The electron theory of organic chemistry is used to correlate these reactions. The variation in reactivity of these various classes of organic compounds is utilized as a method of characterization of organic compounds. Emphasis is on the solution of assigned problems. Mr. Lyle. Prereq.: One year of Organic Chemistry. 3 lec. for Chem. 55; 1 lec. and 2 labs. for Chem. 56; 3 cr.

61-62. Analytical Chemistry. A thorough treatment of the theory and techniques of gravimetric and volumetric analysis followed by special methods of analysis such as those of ion exchange, chromatography, EDTA titrations and instrumental methods such as emission spectrography, flame spectrometry, spectrophotometry, gas chromatography, coulometry, potentionmetry, conductimetry, and polarography. Mr. Daggett. Prereq.: Chem. 5, 6. 3 lec.; 2 lab.; 5 cr.

63. Introductory Radiochemical Techniques. Radio chemical techniques and laboratory practice in the use of apparatus in many fields of science which utilize radio-chemical operations. Mr. Amell. Prereq.: General Inorganic Chemistry and General Physics. 3 lec.; 2 lab.; 5 cr.

82. Introductory Physical Chemistry. Kinetic theory of gases; quantitative laws for behavior of matter in the gas, liquid, and solid phases; valence and the chemical bond; radioactivity; atomic structure and valence; laws of solutions; homogenous and heterogenous equilibrium; colloids, electrochemistry. Designed for Pre-medical and Biology students. Prereq.: Chem. 17-21, Phys. 2, Elementary Mathematics. 3 lec.; 1 lab.; 4 cr.

83-84. Elementary Physical Chemistry. The properties of gases, liquids, and solids; thermochemistry and thermodynamics; solutions, chemical equilibria, reaction rates, conductance, and electromotive force. Mr. Wheeler. Prereq.: Math. 10 or 23, and Physics; prerequisite or concurrent: Analytical Chemistry. 3 lec.; 2 lab.; 5 cr.

85. Inorganic Chemistry. The relationship between chemical reactions and modern concepts of inorganic chemistry on a moderate level. The applicability and limitations of the newer ideas. Mr. Haendler. Prereq.: Chem. 83-84, or permission. 3 lec.; 3 cr.

86. Advanced Physical Chemistry. A review of selected topics in elementary physical chemistry. Mr. Amell. Prereq.: One year of Physical Chemistry. 3 lec.; 3 cr.

87, 88. Chemical Literature and Seminar. Use of the Chemical Library; student reports on topics of interest. Mr. Lyle and Mr. Kuivila. Prereq.: Chem. 48 or 52 and 84. 1 lec.; 1 cr.

89-90. Thesis. The related background and experimental observation of the year's investigation in some selected subject is required. Members of the staff. For seniors in Chemistry who have completed Chem. 48, 62, 84, and have a good point average. 5 lab.; 6 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

CIVIL ENGINEERING

J. Harold Zoller, *Professor;* Russell R. Skelton, *Professor;* Charles O. Dawson, *Professor;* Harold E. Langley, Jr., *Associate Professor;* Tung Ming Wang, *Assistant Professor;* Arthur R. Nicholson, Jr., *Assistant Professor*

1. Surveying. Engineering measurements, using tape, transit, level, and stadia, and the computation, adjustment, and plotting of such measurements. Mr. Dawson and Mr. Nicholson. Prereq.: Math. 21. 1 lec.; 2 lab.; 3 cr.

2. Advanced Surveying. Applications of engineering measurement theory; orientation by solar and Polaris observations; theory and use of the plane table; introduction to photogrammetry, simple curves, and earthwork computations. Mr. Dawson and Mr. Nicholson. Prereq.: C. E. 1. 1 lec.; 2 lab.; 3 cr.

7, (7). Elementary Surveying. A course for non-civil engineering students in the theory and use of tape, level, transit, plane table, and stadia in making plane and topographic surveys. Computations and drafting exercises necessary for making surveys and maps for all purposes. Mr. Dawson and Mr. Nicholson. 2 lec.; 1 lab.; 3 cr.

17. Engineering Materials. Methods of manufacture, physical properties and the application of the various materials used in civil engineering works, including timber, steel, stone, brick, cement, concrete, and bituminous materials. Laboratory tests and reports on the testing of cements, aggregates, concrete specimens, cast iron, structural steel, wood, and other engineering materials. Mr. Skelton. Prereq.: M.E. 35 concurrently or as a prerequisite. 2 lec.; 1 lab.; 3 cr.

25. Theory of Determinate Structures. The stress analysis of structures under fixed and moving loads. Roof trusses, highway and railroad bridges; use of influence lines, lateral bracing, and portals. Mr. Wang and Mr. Zoller. Prereq.: M. E. 35 as a prerequisite or concurrently. 3 lec.; 1 design period; 4 cr.

49, (49). Undergraduate Thesis. A limited number of qualified senior students will be permitted to pursue independent investigations under faculty guidance and write terminal theses reporting the results of their investigations. The thesis shall be typewritten and must be approved by the instructor under whom the work has been done. An approved copy of the thesis must be submitted to the department for retention. Prereq.: Permission of the instructor and senior standing. 2 to 4 cr.

50. Transportation Engineering. The development, organization, administration, and inter-relation of transportation systems and facilities, including railroads, highways, airports, waterways, and pipe lines. Major emphasis will be given to the economics of location, geometric and structural design, construction materials, methods and costs, as applied to modern transportation engineering. Mr. Skelton. Prereq.: C. E. 2. 3 lec.; 3 cr.

52. Fluid Mechanics. Properties of fluids; fluids statics; flow of incompressible and compressible ideal fluids; flow of real fluids; and measurement of fluid properties. Mr. Dawson and Mr. Zoller. Prereq.: M. E. 35 and Math. 23 or 26. 3 lec.; 3 cr.

53, (53). Fluid Mechanics Lab. Experimental study of fluid properties and their relation to the solution of practical problems. Mr. Dawson. Prereq.: C. E. 52 as a prerequisite or concurrently. 1 lab.; 1 cr.

(54). Soil Mechanics. Soil classification, physical properties including permeability, compressibility, bearing capacity, settlement and shear resistance are related to the principles underlying the behavior of soils subjected to various loading conditions. Underground exploration and typical foundation problems are included. Mr. Skelton. Prereq.: C. E. 50 or permission of the instructor. 3 lec.; 1 lab.; 4 cr.

56. Steel Design. The design of members and connections; tension and compression members, beams, plate girders; riveted, bolted, and welded joints. Mr. Wang. Prereq.: C. E. 17 and 25. 2 lec.; 1 design period; 3 cr.

57. Theory of Indeterminate Structures. Beam and truss deflections. The analysis of continuous beams and rigid forms by classical and modern methods; indeterminate trusses. Mr. Wang. Prereq.: C. E. 56. 3 lec.; 1 design period; 4 cr.

59. Reinforced Concrete Design. The principles of reinforced concrete, including rectangular beams, slabs, T-beams, columns, footings, retaining walls. Mr. Wang. Prereq.: C. E. 57 as a prerequisite or concurrently. 2 lec.; 1 design period; 3 cr.

60. Structural Engineering. The planning and design of determinate and indeterminate structures. Introduction to modern design theories; prestressed concrete, plastic theory of steel and reinforced concrete. Mr. Wang. Prereq.: C.E. 57 and C.E. 59. 2 lec.; 1 design period; 3 cr.

63. Water Supply and Treatment. The sources, quantity, quality, and sanitary aspects of public water supplies. Methods of purification and distribution systems. Mr. Langley. Prereq.: C.E. 52. 3 lec.; 3 cr.

64. Sewerage and Sewage Treatment. The theory and problems of sewerage, the principles governing the disposal of sewage, and the various methods of sewage treatment. Mr. Langley. Prereq.: C.E. 63. 3 lec.; 1 lab.; 4 cr.

65. Hydraulic Engineering. Application of fluid mechanics to hydraulics problems, such as reservoirs, dams, control works, open-channel flow, hydroelectric power, irrigation, drainage, and multipurpose projects. Prereq.: C.E. 52. 2 lec.; 1 lab.; 3 cr.

66. Hydrology. The occurrence and physical effects of water on the earth, including meteorology, groundwater, runoff, and streamflow routing. Mr. Langley. Prereq.: C.E. 52 concurrently or as a prerequisite. 2 lec.; 1 lab.; 3 cr.

67. Highway Engineering I. Highway organization, administration, finance, planning, programming, traffic surveys, traffic methods; highway laws, contracts, specifications; highway capacity, geometric design, access control, safety, accident studies; pavement selection, performance, and maintenance. Mr. Skelton. Prereq.: C.E. 50. 3 lec.; 3 cr.

68. Highway Engineering II. Design of flexible and rigid pavements and bases for highways, airports, and city streets; pavement selection, construction methods, materials, specifications, and engineering cost estimates. Mr. Skelton. Prereq.: C.E. 50. 3 lec.; 1 lab.; 4 cr.

71. Community Planning. An introduction to community planning. Social, economic, and physical factors affecting community planning; content and extent of desirable community planning programs, including purpose and scope, the preliminary survey, elements of community land planning, the master plan, transportation systems, street patterns and traffic, motor vehicle parking, airport sites, public building sites, parks and recreational facilities, zoning, control of land subdivision, neighborhood centers, housing, legal, financial and economic problems, and redevelopment of blighted areas. Mr. Dawson. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

74. Timber Design. Properties and characteristics of structural woods, mechanics of wood, connection methods, design of timber members and connections in beams, columns, and trusses, and glued laminates of wood. Mr. Wang. Prereq.: C.E. 56 and permission of the instructor. 1 lec.; 1 design period; 2 cr.

77. Contracts, Specifications, and Professional Relations. The essential elements required in engineering contracts; the purposes and content of specifications; professional conduct, relations, and ethics; and estimating by means of quantity surveys and unit cost methods. Mr. Dawson. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

78. Structural Members. Selected problems in the analysis and design of structural members; such as beams on elastic foundations, curved beams, beam columns, buckling, torsion. Mr. Wang. Prereq.: C.E. 56 and permission of the instructor. 3 lec.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

DAIRY SCIENCE

Kenneth S. Morrow, *Professor;* Harry A. Keener, *Professor;* C. Hilton Boynton, *Professor;* Nicholas F. Colovos, *Associate Professor;* Herbert C. Moore, *Associate Professor*

5. Fundamentals of Dairying. A general survey of the dairy industry; the selection, feeding, and management of dairy cattle; the composition and properties of milk and other dairy products; dairy manufacturing processes; market milk. Mr. Morrow and Mr. Moore. 2 lec.; 1 lab.; 3 cr.

30. Dairy Bacteriology. The application of bacteriology principles to the production and processing of milk and other dairy products. Mr. Moore. 2 lec.; 2 lab.; 4 cr.

33. Dairy Products Judging. The various standards and grades of dairy products, with practice in judging milk, butter, cheese, and ice cream. Mr. Moore. 1 lab.; 1 cr.

34. Dairy Cattle Judging. Comparative judging of dairy cattle using animals in the University herd and in nearby herds. Mr. Morrow. 1 lab.; 1 cr.

36. Advanced Dairy Cattle Judging. Continuation of Dairy Science 34. Emphasis on training for participating on dairy cattle judging teams. Mr. Morrow. Prereq.: Dy. Sci. 34. 1 lab.; 1 cr.

60. Dairy Seminar. The literature covering recent research in the various phases of the dairy industry. Students are required to prepare and present oral and written reports on selected topics. Dairy Science staff. 2 lec.; 2 cr.

62. Advanced Dairy Science. Basic data, fundamental observations, and discussions of research contributing to the present status of the dairy industry. Mr. Moore. Prereq.: Adequate preparation in chemistry and bacteriology. 2 lec.; 2 cr.

63. Dairy Cattle. Purebred dairy cattle, breed history, pedigrees; family lines and methods of outstanding breeders; the application of the principles of genetics to the improvement of dairy cattle herd analysis. Mr. Morrow. 2 lec.; 1 lab.; 3 cr.

64. Milk Production. Feeding and management of dairy animals; calf feeding; raising young stock; feeding for economical milk production. Mr. Boynton. 2 lec.; 1 lab.; 3 cr.

65. Market Milk. The producing, handling, and distribution of market and certified milk; dairy farm inspection; control of milk supply. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

66. Ice Cream, Butter, and Cheese. The making, handling, and marketing of ice cream, butter, and cheese. Mr. Moore. 2 lec.; 1 lab.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

DRAMA

(See Speech and Drama)

ECONOMICS

(See Whittemore School of Business and Economics)

EDUCATION

Everett B. Sackett, *Professor;* Thomas O. Marshall, *Professor;* Wayne S. Koch, *Professor;* Carleton P. Menge, *Associate Professor;* Paul H. McIntire, *Associate Professor;* Paul R. Lohnes, *Assistant Professor;* Eugene C. Jorgenson, *Assistant Professor;* John D. Bardwell, *Lecturer*

Carl Lundholm, *Professor* (Physical Education); George R. Thomas, *Professor* (Art-Education); Philip S. Barton, *Professor* (Agricultural-Education); Marion C. Beckwith, *Professor* (Physical Education); Doris E. Tyrrell, *Associate Professor* (Secretarial Studies-Education); E. William Olson, *Associate Professor* (Physical Education); Lewis C. Goffe, *Associate Professor* (English-Education); Richard H. Balomenos, *Assistant Professor* (Mathematics-Education); John B. Whitlock, *Associate Professor* (Music-Education); Joseph J. Petroski, Jason Boynton, Adelaide Dodge, Anne McWeeney, Alger Bourne, George W. Pasichuke, E. Harry Boothby, Iris Valley, *Consultants in Teacher Education*

Courses in Education

41, (41). Educational Psychology. An examination of behavior in infancy, childhood, and adolescence with emphasis on the developmental effects of home and school. This course is a prerequisite to Liberal Arts undergraduate teaching preparation programs. Mr. Menge and Mr. Lohnes. Not open to freshmen. 3 lec.; 3 cr.

57, (57), Principles of Learning. Psychology of learning as it operates within the classroom. Prereq.* Mr. Koch, Mr. Menge, and Mr. Lohnes. 3 lec.; 3 cr.

58, (58). Principles of Teaching. Application of the theories of learning studied in Education 57, with specific emphasis upon the following: organization of content, specific planning, and a study of procedures essential to the evaluation of the learning processes. Prereq.* Mr. Marshall, Mr. Lohnes, and Mr. Jorgenson. Two 2-hour lec.-labs.; 3 cr.

* The prerequisite for courses in education is permission of the Department, based upon the following.
Ed. 41: Open to any student, sophomore or above.
Ed. 57: Ed. 41 with grade of C or better, cumulative average of 2.2, average of 2.5 in major.
Ed. 58: Same as for Ed. 57 plus a C or better in Ed. 57, a personality suitable for teaching, and a speech test.

59, (59). Principles of Education. American schools have developed, and are still developing, in unique forms quite unlike their European counterparts. Among Americans, however, there are basic disagreements concerning the direction our schools should take. This course deals with these conflicts of philosophy, the problems of American education and research pertinent to these problems. Prereq.* Mr. Sackett. 3 lec.; 3 cr.

(63). Instructional Media. To help improve ability to communicate ideas through materials and equipment commonly available in a school audio-visual center. Educational films, bulletin board design, the role of language labs, educational television, programmed learning, and media research will receive particular attention. A laboratory period of one hour each week is required in addition to the regular class period. Mr. Bardwell. Prereq.: Principles of Learning or permission of instructor. 3 cr.

64. Utilization of Testing in Public Education. Strategies for discovering and employing predictive validities of standardized tests in public school work are studied and practiced. Mr. Lohnes. 3 cr.

71-72. Elementary School Teacher Preparation. A block program including observation; psychology of learning, principles of teaching reading, language arts, social studies, mathematics, science, and other elementary school subjects; practice teaching; and a synthesizing seminar. Prereq.* 16 cr. per sem.

Courses in Problems in the Teaching of High-School Subjects

The following courses are devoted to a study of problems, objectives, selection and organization of subject matter, teaching and testing techniques, and classroom management in the teaching of the respective subjects.

For details concerning prerequisites and nature of these courses, see descriptions given under respective subject matter departments.

Agriculture-Education (Ag-Ed) 89, 90. Methods of Teaching Farm Mechanics in Vocational Agriculture. Mr. Gilman. 1 lab.; 1 cr.

Agricultural-Education (Ag-Ed) 91, 92. Problems in the Teaching of Vocational Agriculture. Mr. Barton. Open only to juniors and seniors in Agricultural Teacher Preparation. 2 lec. and 1 lab.; 3 cr.

Art-Education (Art-Ed) 91. Problems of Teaching Art in Elementary Schools. 3 cr. Mr. Thomas.

Art-Education (Art-Ed) (92). Problems of Teaching Art in Secondary Schools. 3 cr. Mr. Thomas.

Biology-Education (Biol-Ed) 91. Problems in the Teaching of High-School Biology. 3 cr. Mr. Schaefer.

English-Education (Engl-Ed) 91. Problems in the Teaching of High-School English. 3 cr. Mr. Goffe.

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* The prerequisite for courses in education is permission of the Department, based upon the following.
Ed. 59. Ed. 57.
Ed. 71-72: Senior standing, completion of all General Liberal Arts requirements, 18 semester hours in a Liberal Arts major subject, personality suitable for teaching, experience working with groups of children, Ed. 41 or Home Ec. 25 with grade of C or better, cumulative average of 2.2.
Courses in Problems in the Teaching of High-School Subjects: (91 courses) See Prerequisites given in the description of the specific course.
Ed. 94: Same as for Ed. 58 plus a C or better in a 91 course (if offered), at least 18 semester hours in the subject to be taught, plus approval based upon selection processed by both the student's major department and the Department of Education.

History-Education (Hist-Ed) 91. Problems in the Teaching of High-School History and Other Social Studies. 3 cr.

Home Economics-Education (HE-Ed) 91. Problems in the Teaching of High-School Home Economics. 3 cr.

Languages-Education (Lang-Ed) 91. Problems in the Teaching of Modern Languages in the High-School. 3 cr. Mr. Leighton

Mathematics-Education (Math-Ed) 91. Problems in the Teaching of High-School Mathematics. 3 cr.

Music-Education (Mu-Ed) 90. Problems in the Teaching of Elementary School Music. 3 cr. Mr. Whitlock.

Music-Education (Mu-Ed) 93. Problems in the Teaching of Secondary School Music. 3 cr. Mr. Whitlock.

Physical Education-Education (PE-Ed) 91. Problems in the Teaching of Physical Education for Women. 3 cr. Miss Newman.

Courses in Supervised Teaching

This work is required in the Teacher Preparation program. It is open only to students whose applications are approved by the Chairman of the Department of Education and the Coordinators of Student Teaching in the subject or subjects in which the applicant desires to do supervised teaching. *Applications should be filed in the office of the Department of Education on or before November 15 of the academic year in which the supervised teaching is to be done.*

Students may be enrolled for from 6 to 14 credits* of work in Supervised Teaching, usually in the second semester of the senior year. Students registered in the College of Liberal Arts may count no more than 9 semester credits in Supervised Teaching toward the fulfillment of the major requirements in Education.

Education-Agriculture (Ed-Ag) 93. Supervised Teaching in Vocational Agriculture. Prereq.: Senior standing in Agricultural Education curriculum.

Education-Art (Ed-Art) 94. Supervised Teaching in Art.

Education-Biology (Ed-Biol) 93, 94. Supervised Teaching in High-School Biology.

Education-Commerce (Ed-Cs) 94. Supervised Teaching in High-School Commercial Subjects.

Education-Elementary (Ed-El) 94. Supervised Teaching in the Elementary School.

Education-English (Ed-Engl) 94. Supervised Teaching in High-School English.

Education-General Science (Ed-GS) 94. Supervised Teaching in High-School General Science.

Education-History (Ed-Hist) 94. Supervised Teaching in High-School History and Other Social Studies.

Education-Home Economics (Ed-HE) 94. Supervised Teaching in High-School Home Economics.

Education-Language (Ed-Lang) 94. Supervised Teaching in High-School Modern Foreign Language.

Education-Latin (Ed-Lat) 94. Supervised Teaching in High-School Latin.

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* Except Ed Ag. 93 wherein the credits are 17 and in Ed.-H.E. 94 wherein they are 7.

Education-Mathematics (Ed-Math) 94. Supervised Teaching in High-School Mathematics.

Education-Music (Ed-Mu) 93, 94. Supervised Teaching in Elementary and Secondary School Music.

Education-Physical Education (Ed-PE) (92), 92. Directed Teaching of Physical Education for Women. Prereq.: PE-Ed 91 or concurrently. 1 lec.; 2 5-hr. lab.; 6 cr.

Education-Physical Education (Ed-PE) 93, (93). Directed Teaching in Physical Education for Men. Prereq.: Zool. 17-18; P. E. 23 and 61. The student must have completed the methods course in the sport which he is directing or take the course concurrently. 3 cr.

ELECTRICAL ENGINEERING

Alden L. Winn, *Professor;* Leon W. Hitchcock, *Professor Emeritus;* William B. Nulsen, *Professor;* Robert N. Faiman, *Professor;* John B. Hraba, *Professor;* Albert D. Frost, *Professor;* Fletcher A. Blanchard, *Associate Professor;* Joseph B. Murdoch, *Associate Professor;* Donald W. Melvin, *Assistant Professor;* Ronald R. Clark, *Assistant Professor;* Robert W. Goodrich, *Assistant Professor*

1-2. Electrical Engineering. The fundamental physical laws and concepts of electrical engineering and their application to circuits, electric and magnetic fields, instrumentation, and direct-current machinery. Prereq.: Math. 23 or 26 taken concurrently and Phys. 18. E.E. 1: 1 lec.; 1 rec.; 1 lab. or Conf.; 3 cr. E.E. 2: 1 lec.; 2 rec.; 1 lab.; 4 cr.

3-4. Applied Electromagnetics. Electric and magnetic circuits, vector diagrams, and equivalent circuits as applied to transformers, synchronous, and asynchronous machines. Prereq.: E.E. 2, Math. 22. Required of juniors in Electrical Engineering. 3 rec.; 3 cr.

5. Circuit Theory. Single phase and polyphase circuits, network theorems and wave analysis. Prereq.: E.E. 2. Required of juniors in Electrical Engineering. 3 lec.; 3 cr.

9. Physical Electronics. Electron ballistics, conduction in gases, vacuum, metals, and semiconductors; theory of emission; theory of operation, characteristic curves, and equivalent circuits for election devices such as vacuum and gas tubes, solid state rectifiers, and transistors. Prereq.: E.E. 5 taken concurrently. Required of juniors in Electrical Engineering. 3 lec.; 3 cr.

10. Electronic Circuits. Theory of operation, analysis, and design of active circuits containing electron devices. Prereq.: E.E. 9. Required of juniors in Electrical Engineering. 3 lec.; 1 lab.; 4 cr.

15, 16, 17, 18. Student Branch AIEE-IRE. A student-conducted organization, operated under the by-laws of the institutes, designed to introduce the student to professional society activities. Approximately 10 to 12 meetings are scheduled during the year, usually in the evenings. These meetings provide lectures by industrial representatives, inspection trips, and attendance at state and regional meetings. Each student is required to become a student member of either the AIEE or the IRE with annual dues of $5.00 per year. Required of juniors and seniors in Electrical Engineering. No credits.

23, 24. Electrical Laboratory. Experimental investigations in the principles of electrical engineering as applied to direct and alternating current

machines. Laboratory procedures and presentation of engineering reports. Prereq.: E.E. 2. Required of juniors in Electrical Engineering. 1 lab.; 2 cr.

25, 26. Electrical Laboratory. Experimental investigations in the principles of electrical engineering as applied to electrical engineering systems, devices and components. Formal reports are required. Prereq.: E.E. 4, E.E. 10. Required of seniors in Electrical Engineering. 1 lab.; 2 cr.

33. Fundamentals of Electrical Engineering. Direct and alternating current circuits, instruments and machines, and rectifiers and transformers. Prereq.: Physics 24. Required of juniors in Agricultural, Chemical, and Civil Engineering. 3 lec.; 1 lab.; 4 cr.

39. Electrical Engineering Fundamentals. Electric and magnetic fields and circuits. Prereq.: Physics 24. Required of seniors in Chemical Engineering and juniors in Civil and Mechanical Engineering. 3 lec.; 1 lab.; 4 cr.

40. Circuits, Machinery, and Control. Continuation of electric circuits. Applications of electrical engineering to machines and systems. Prereq.: E.E. 39. Required of juniors in Mechanical Engineering. 3 lec.; 1 lab.; 4 cr.

41. Electronic Fundamentals. Physical electronics, electronic circuits with emphasis on instrumentation. Prereq.: E.E. 33 or 39. Required of seniors in Mechanical Engineering. 2 lec.; 1 lab.; 3 cr.

45. Transmission Lines and Network. Transmission line fundamentals, T and Pi sections, filters, and symmetrical components. Prereq.: E.E. 5. Required of seniors in Electrical Engineering. 3 lec.; 3 cr.

46. Electric Fields. Static electric and magnetic fields, electromagnetic fields, Maxwell's equations, wave equations, plane waves. Prereq.: E.E. 2, Math. 24. Required of seniors in Electrical Engineering. 3 lec.; 3 cr.

52. Industrial Electronics Fundamentals. Application of electronics to industrial processes. Prereq.: E.E. 41. Limited to students not registered in the Electrical Engineering curriculum. 2 lec.; 1 lab.; 3 cr.

58. Electronic Systems Analysis and Design. Techniques in coding, storage, and transfer of information. Analysis and design of electronic systems. Prereq.: Permission of Instructor. 3 lec.; 3 cr.

60. Advanced Circuit Theory. Steady state and transient analysis, derivation of fundamental formulas and constants; application of LaPlace transforms. Prereq.: Permission of instructor. 3 lec.; 1 conf.; 4 cr.; when offered without conference period, 3 cr.

62. Illumination. Radiation, fundamental processes in gases, atomic spectra, sources of visible and near visible energy, lamp circuitry, lighting and wiring design, control of light, photometry, and color. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

70, (70). Electrical Engineering Projects. A laboratory or advanced study course. Each student will either join one of the department research projects or engage in a project which is in one of the following areas of current staff interest: Acoustics and Electronic Systems (Mr. Frost), Control Systems (Mr. Blanchard, Mr. Clark), Illumination (Mr. Murdoch), Magnetic Amplifiers (Mr. Melvin), Non-linear Analysis (Mr. Hraba), Semiconductors (Mr. Winn), and Transient Analysis (Mr. Nulsen). Admission to the course will be limited to those accepted by a staff member. 1-4 conf. or 1-2 lab.; 1-4 cr.

78. Industrial Electronics. Analysis and design of equipment for the measurement, instrumentation, and control of industrial processes; introductory theory of closed loop systems. Prereq.: Permission of the instructor. 3 lec.; 1 lab.; 4 cr.

80, (80). Engineering Analysis. The basic principles and analytical methods employed in the solution of complex problems in the various branches of engineering. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

82. Control Systems. Fundamental principles involved in the design and analysis of feedback control systems. Prereq.: Permission of the instructor. 3 lec.; 3 cr.; or 3 lec. and 1 lab.; 4 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

ENGLISH

Sylvester H. Bingham, *Professor;* William G. Hennessy, *Professor Emeritus;* Carroll S. Towle, *Professor;* Robert G. Webster, *Professor;* J. Howard Schultz, *Professor;* Dale S. Underwood, *Professor;* Lucinda P. Smith, *Associate Professor Emerita;* G. Harris Daggett, *Associate Professor;* Max S. Maynard, *Associate Professor;* John C. Richardson, *Associate Professor;* Lewis C. Goffe, *Associate Professor;* Edmund G. Miller, *Associate Professor;* Philip L. Nicoloff. *Assistant Professor;* Joseph P. McElroy, *Assistant Professor;* Thomas A. Williams, Jr., *Assistant Professor;* S. Anthony Caldwell, *Instructor;* Nicholas P. Nichols, *Instructor;* John A. Taylor, *Instructor;* Lee S. Baier, *Instructor;* Harry G. Martens, *Instructor;* Douglas L. Zweizig, *Instructor;* Fredelle B. Maynard, *Lecturer*

*A. Improvement in Writing. Required of all students whose attainments in the *fundamentals of English* are found to be unsatisfactory. Assignment to classes from which the students may be excused either at the end of the semester or at the end of the year. 3 rec.; no credit.

*C. Improvement in Reading. Intensive drill in reading skills for six weeks. 3 rec.; no credit.

1-2, (2), (1). Freshman English. Training to write more correctly and with more force and to read with more appreciation and discernment the chief types of literature. The staff of the department under the chairmanship of Mr. Miller. 3 lec.; 3 cr.

12. The Bible as Literature. The various literary types found in the Bible and a survey of the influence of the Bible on English literature. Mr. Schultz. Prereq.: Engl. 1-2. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

13, 14. An Introduction to English Literature. The development of English literature from its beginning to the 20th century by means of selected readings. Mr. Richardson, Mr. Miller, Mr. McElroy, and Mr. Taylor. Prereq.: Engl. 1-2. 3 lec.; 3 cr.

15, 16. A Survey of American Literature. Mr. Webster, Mr. Daggett, Mr. Goffe, and Mr. Nicoloff. Prereq.: Engl. 1-2. 3 lec.; 3 cr.

23, (23). Writing of Technical Reports. Mr. Webster, Mr. McElroy, and Mr. Caldwell. Required of seniors in Agriculture and in Mechanical, Electrical, and Civil Engineering. 1 rec.; 1 lec.; 2 cr.

25-26. Advanced Composition. Practice with compositions of varying lengths. Class discussions with illustrative readings. Weekly conferences. Mr. Towle and Mr. Williams. Prereq.: Engl. 1-2. 3 lec.; 3 cr.

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* Any student may be recalled and reassigned to an instruction group at any time in his four years at college upon report of any member of the Faculty that his work in composition or in reading is deficient.

53, 54. Writing as an Art. The study and practice of forms of writing, together with an examination of the history of literary philosophy. Practice in mutual criticism through class workshop discussions and written comment. Freedom in selection and pursuance of writing interests. Individual conferences. Mr. Towle. Prereq.: Engl. 25 or its equivalent. 2 lec.; 1 rec.; 3 cr. (Alternate years; offered 1962-63.)

55, 56. Chaucer. Mr. Underwood. 3 rec.; 3 cr.

57, 58. Shakespeare's Plays. The major histories, comedies, and tragedies. Mr. Schultz. 3 lec.; 3 cr.

59. Milton. Mr. Schultz. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

60. Boswell's Johnson. Mr. Maynard. 3 lec.; 3 cr. (Not offered 1962-63.)

61. Wordsworth. Mr. Miller. 3 lec.; 3 cr. (Alternate years; offered 1962-63).

62. Browning. Mr. Daggett. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

63, 64. English Literature in the Sixteenth Century. Mr. Schultz. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

65, 66. English Literature in the Seventeenth Century. Mr. McElroy and Mr. Underwood. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

67, 68. English Literature in the Eighteenth Century. Mr. Maynard. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

69, 70. The English Romantic Period. Wordsworth, Coleridge, Lamb, Byron, Shelley, Keats, Hazlitt, DeQuincey, Mr. Miller. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

71, 72. Victorian Prose and Poetry. Major non-fictional prose from Carlyle to Stevenson and major poetry from Tennyson to Hardy. Mr. Miller. 3 lec.; 3 cr. Alternate years; offered 1962-63.)

73, 74. British Literature of the Twentieth Century. Mr. Richardson. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

75. New England Renaissance. Emerson, Thoreau, and other transcendentalists. Mr. Daggett. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

76. American Novel in the Nineteenth Century. Mr. Webster. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

77. American Poetry of the Nineteenth Century. Mr. Daggett. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

79, 80. American Literature of the Twentieth Century. Mr. Towle. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

81, 82. Introduction to English Drama. The development of English drama, exclusive of Shakespeare, from the Middle Ages to the present. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

83, 84. The English Novel of the Eighteenth and Nineteenth Centuries. Mr. Bingham and Mr. Miller. 3 lec.; 3 cr.

85. Expository Writing. Prereq.: Engl. 1-2. Limited to students in the teacher preparation program and graduate students working for the M.S.T. degree. 3 cr.

86. English Grammar. Mr. Goffe. Prereq.: English 1-2. Limited to students in the teacher preparation program and graduate students working for the M.S.T. degree. (Not open to students who have had English 27.) 3 cr.

87, 88, 89. Critical Analysis. Analysis of three forms of writing: 87, Exposition; 88, Fiction; 89, Poetry. Mr. Bingham and Mr. Richardson. Prereq.: Engl. 1-2. (Not open to students who have had English 43, 44, 45.) 3 cr.

English-Education. (Engl.-Ed) 91. Problems in the Teaching of High-School English. Principles and methods of teaching, literature and composition in secondary schools. For all students who plan to teach English in secondary schools, and for all students majoring in Language, History, or Education. Mr. Goffe. Prereq.: A grade of C or better in Educ. 58. Literature majors in English by permission of the instructor; all other students by fulfillment of the following: Engl. 13, 14; 16; 25; 87, 88, 89; one semester of Engl. 57, 53; a demonstration of skill in the use of English grammar, either by the satisfactory completion of Engl. 86 or by examination. 3 lec.; 3 cr.

Summer Institute Courses For Teachers of English

92. Basic Principles of Language-Study. This course has three principal aims: (1) to make the student aware of language as a field of study, (2) to show him the basic assumptions and methods of linguistics, and (3) to encourage him to undertake further study of linguistics and offer guidelines for that study. 2 cr.

93. The Analysis of Literature. The intent of this course is to increase the student's awareness of what is involved in the close reading of the major types of literary work. The teacher will touch on examples of several genres and will apply to each the basic tools of literary study: awareness of point of view, analysis of structure, semantic examination of meaning and tone, etc. 2 cr.

94. Theory and Practice of Composition. The principal aim of this course is to help the student become a better writer himself and a better critic of others' writing. It will deal mainly with expository prose as the variety most widely useful. 2 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

ENTOMOLOGY

James G. Conklin, *Professor;* Walter C. O'Kane, *Professor Emeritus;* Robert L. Blickle, *Professor;* William R. Lee, *Assistant Professor*

(2), 2. Elementary Entomology. An introduction to entomology in its broad aspects. The structure, biology, and classification of insects. This course should be particularly useful to students contemplating a major in the field of biology-education. Each student electing the laboratory work is required to make an insect collection. Students in the College of Technology may be permitted to elect the lectures only. Mr. Conklin. 2 lec.; 1 lab.; or 2 lec.; 2-3 cr.

46. Forest Entomology. Structure and development of insects. Orders and families of insects of importance to foresters. Principles of insect control. Biology and control of representative forest insects. Each student is required to make an insect collection. Adapted especially for Forestry majors. Open to any student. Mr. Conklin. 2 lec.; 1 lab.; 3 cr.

48. Biology of Social Bees. Behavior and life history of the social bees with emphasis on the use of communication to coordinate colony activities. Students interested in beekeeping should arrange for a special problem in the University Apiary by electing Ent. 59 or 60 in addition to taking this course. Mr. Lee. 2 lec.; 2 cr.

54. Medical Entomology. Insects and arachnids in relation to public health. The more important disease carriers, their biologies, and means of control. Adapted especially for students interested in public health or medicine. Mr. Blickle. Elective for juniors and seniors. 2 lec.; 1 lab.; 3 cr.

57-58. Advanced Entomology. The anatomy and physiology of insects. Systematic entomology. Mr. Conklin, Mr. Blickle, Mr. Lee. Open to others than Entomology majors by permission of the Department Chairman. 2 lec.; 2 lab.; 4 cr.

59, 60. Advanced Economic Entomology. Problems in applied entomology and apiculture; the literature of economic entomology; investigational methods; studies of the specialized phases of entomology. Mr. Conklin, Mr. Blickle, Mr. Lee. Required of Entomology majors. Open to others than Entomology majors by permission of the Department Chairman. 1 to 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

FOREIGN LANGUAGES AND LITERATURES

R. Alberto Casas, *Professor;* Clifford S. Parker, *Professor Emeritus;* John S. Walsh, *Professor Emeritus;* Louis J. Hudon, *Professor;* Alexander P. Danoff, *Assistant Professor;* Ralph H. Cryesky, *Assistant Professor;* Charles H. Leighton, *Assistant Professor;* Nicholas E. Alssen, *Assistant Professor;* David A. Collins, *Instructor;* Paul Chasse, *Instructor*

General Language and Literature

Register for the following courses as Lang. 1, etc.

1, 2. Survey of Greek and Roman Literature. The masterpieces of Greek and Roman literature in translation. Through the study of literature, the students will learn about the ancient civilization from which much of our contemporary culture has come. A cultural course for the student unprepared to read the original languages but desiring acquaintance with the subject matter. A background course for majors in such subjects as English, History, Latin, or the modern languages and literatures. *Not open to freshmen.* 3 lec.; 3 cr.

51, 52. Survey of Modern European Literature. The Renaissance, classicism, romanticism and realism studied as international movements. Stress is not upon the details of each national literature, but upon the interdependence of the literatures of the various countries. Conducted in English. 3 lec.; 3 cr.

73. Introduction to Romance Philology. The historical development of French and Spanish from Vulgar Latin, phonology, morphology, syntax, semantics, etymology. Frequent reference is made to the spoken languages of today as well as to comparative semantics. Mr. Cryesky. Prereq.: One year of Latin and familiarity with two Romance Languages. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

Language-Education (Lang-Ed) 91. Problems in the Teaching of Modern Languages in the High School. The special objectives, methods,

and devices of modern language teaching in high school. For prospective teachers of French, German and Spanish. Prereq.: Education 58 with grade of C or better (or one year of teaching experience) and one of the following courses: French 6, German 6, Spanish 6. 3 lec.; 3 cr.

FRENCH

Register for the following courses as Fr. 1, etc.

New students will be assigned to French 1, French 2, French 3, French 4, or French 5 on the basis of their performance in the French placement examination.

*1-2. Elementary French. For students without previous knowledge of French. Aural-oral practice, and the study of fundamental speech patterns, reading and writing to achieve a firm basis for an active command of the language. *No credit toward a major.* 5 rec.; 2 lab.; 5 cr. (*Students who offer two entrance units or two years of high school work in French, and who do not qualify for French 3 will not be permitted to register for credit for French 1. They may, however, audit the course with proper authorization and register for credit for the second half of the course, French 2.*)

3-4. Intermediate French. Intensive and extensive reading of complete texts of intrinsic literary and intellectual worth, formal review of the structure of the language, training in oral and written expression of ideas. Classroom discussion and papers in French. 3 rec.; 1 lab.; 3 cr. *No credit toward a major. Open by placement examination, and to students who have passed French 2 with a grade of C. Students making a grade of A in French 4 may take courses numbered 50 and above with the permission of the department.*

5-6. Introduction to French Literature and Thought. Reading and analysis of significant works in French literature and thought. Organized around such topics as "The individual and society", "Social criticism", etc. Outside readings on the historical and cultural background of the works read. Papers and discussion in French. Term paper in English. 3 lec.; 3 cr. *This course or its equivalent prerequisite to all higher courses in French. Open to students who have achieved a grade of A or B in French 2 by permission of the department, to students who have achieved a grade of C or better in French 4, and by placement examination.*

12. French Grammar. Thorough study of the structure of the French language. 2 rec.; 2 cr. *No credit toward a major. Prereq.: French 6 but it may be taken concurrently with French 6.*

41. Early French Literature. French literature of the Middle Ages and the Renaissance in modern French adaptation where necessary. Background readings in history and culture. Conducted in French. Prereq.: French 6. 3 lec.; 3 cr. (Not offered 1962-63.)

59-60. French Literature of the Seventeenth Century. 59: Historical and literary background of French Classicism, poetry, Corneille, Pascal, and Molière's early plays. 60: Molière, Racine, La Fontaine, Mme. de La Fayette, Boileau, and La Bruyère, Lesage, the beginning of the philosophical movement. Conducted in French. Prereq.: French 6. 3 lec.; 3 cr.

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* The content of French 1 is equivalent to Elementary French 1-2 and French 2 is equivalent to French 3-4 under the former 3-credit system.

No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

64. Eighteenth Century French Literature and Thought. The literary and philosophical currents, including Montesquieu, Marivaux, Rousseau, Voltaire, the *encyclopedistes,* Beaumarchais and others. Conducted in French. Prereq.: French 6. 3 rec.; 3 cr.

67-68. Nineteenth Century French Literature. 67: Romanticism; Mme de Stael, Chateaubriand, Lamartine, Hugo, Vighy, Musset. 68: Late Romanticism; Realism; Stendhal, Balzac, Flaubert; Hugo, the Parnassian school. Conducted in French. Prereq.: French 6. 3 rec.; 3 cr. (Not offered 1962-63.)

70. Introduction to Modern French Poetry. Baudelaire, Rimbaud, Mallarmé, Valéry and others. Prereq.: French 6. 3 lec.; 3 cr. (Not offered 1962-63.)

81-82. Contemporary French Novel and Theater. 81: Zola, the Goncourts, Proust, Gide, Becque, Maeterlinck, and others. 82: Mauriac, Malraux, Bernanos, Sartre, Camus, Claudel, Cocteau, Pagnol, Anouilh, Giraudoux and others. Conducted in French. Prereq.: French 6. 3 lec.; 3 cr.

90. Advanced Language and Style. Translation of literary texts, intensive study of the principal techniques of style, *explication de textes.* Open to qualified students who have had a minimum of six hours of French courses numbered 41 and above. 3 lec.; 3 cr. (Not offered 1962-63.)

German

Register for the following courses as Ger. 1, etc.

New students will be assigned to German 1, German 2, German 3, German 4, or German 5, on the basis of their scores on the German reading examination.

*1-2. Elementary German. For students without previous knowledge of German. Aural-oral practice, and the study of fundamental speech patterns, reading and writing to achieve a firm basis for an active command of the language. *No credit toward a major.* 5 rec.; 2 lab.; 5 cr. *(Students who offer two entrance units or two years of high school work in German and who do not qualify for German 3 will not be permitted to register for credit for German 1. They may, however, audit the course with proper authorization and register for credit for the second half of the course, German 2.)*

3-4. Intermediate German. Formal review of the structure of the language, further training in spoken and written German, intensive reading of selected literary texts. Outside readings in special fields of interest. 3 rec.; 1 lab.; 3 cr. *Open by placement examination, and to students who have passed German 2 with a grade of C. Students making a grade of A in German 4 may take courses numbered 50 and above with the permission of the department.*

5-6. Introduction to German Literature. Reading and analysis of works selected from the most important periods in German literature. Outside readings on the historical and cultural background of the works read. Papers and discussion in German. Term paper in English. 3 rec.; 3 cr. *This course or its equivalent prerequisite to all higher courses in German. Open to students who have achieved a grade of A or B in German 2 by permission of the department, to students who have achieved a grade of C or better in German 4, and by placement examination.*

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* The content of German 1 is equivalent to Elementary German 1-2 and German 2 is equivalent to German 3-4 under the former 3-credit system.

No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

53-54. German Literature of the Eighteenth Century. German literature from the beginning of the century to the advent of Romanticism. Topics include: the rise and development of classicism, the masterpieces of Lessing, Goethe, and Schiller, the decline and disintegration of Classicism in the 18th century. Collateral readings. Prereq.: Ger. 6. 3 lec.; 3 cr. (Not offered 1962-63.)

55-56. German Literature of the Nineteenth Century. The period from 1800 to the death of Nietzsche from four points of view: (a) rise and development of the Romantic School including the romantic opera, (b) the drama as reflected in the works of Kleist, Grillparzer, Hebbel, Hauptman, (c) the novel as an illustration of social and cultural conditions with emphasis on the humorists (Richter, Grabbe, Meyer, Keller, Busch), (d) the collapse of the idealistic systems of philosophy as reflected in the works of Schopenhauer, Nietzsche, and others. Prereq.: Ger. 6. 3 lec.; 3 cr. (Not offered 1962-63.)

57-58. Twentieth Century German Literature. Literature from 1900 to the present time, including the schools of Naturalism, Impressionism, Expressionism, and "Neue Sachlichkeit". Emphasis on the works of Kafka and of the Nobel-prize winners, Hauptmann, Spitteler, Thomas Mann, and Hesse. Readings and discussions will be supplemented by articles and commentaries from current German literary magazines. Prereq.: Ger. 6. 3 lec.; 3 cr. (Not offered 1962-63.)

Greek

Register for the following courses as Gr. 1, etc.

1-2. Elementary Greek. Grammar, composition translation. Prereq.: Permission of the instructor. 3 lec.; 3 cr. (Not offered 1962-63.)

3-4. Intermediate Greek. Translation of several books of Homer's *Iliad*; work in grammar and word derivation. Prereq.: Gr. 2. 3 lec.; 3 cr. (Not offered 1962-63.)

ITALIAN

Register for the following as Ital. 1, etc.

*1-2. Elementary Italian. Elements of Italian grammar, reading of simple prose, oral practice. Mr. Cryesky. 3 lec.; 3 cr. *This course cannot be counted for major credit.* (Not offered 1962-63.)

Latin

Register for the following courses as Lat. 1, etc.

New students will be assigned to Latin 1, Latin 3, or Latin 5 on the basis of their scores on the Latin reading examination.

1-2. Elementary Latin. Elements of grammar, reading of simple prose. The changes in meaning and form of English and Romance language derivatives from Latin. 3 lec.; 3 cr. *(Students who offer two entrance units [two years of high-school work] in a language will not be permitted to register for the first semester of that elementary language course for credit. They may, however, audit the course with proper authorization.)* This course cannot be counted for major credit. (Not offered 1962-63.)

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* See page 157 for explanation of footnote.

3-4. Intermediate Latin. A review of Latin grammar and vocabulary, followed by readings in prose and poetry. Prereq.: Lat. 2 or the equivalent. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

5-6. Latin Prose and Poetry. Selections from Livy, Catullus, Ovid, Phaedrus, Martial, and the odes of Horace. Translation, lectures, and study of the influence of Latin on English poetry. Prereq.: Lat. 4 or equivalent. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

53-54. The Historians. Livy, Suetonius, and Tacitus in selected works. Illustrated lectures and outside readings on the historical, social, and political background of Rome essential to the student or teacher of Latin. Prereq.: Lat. 6 or equivalent. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

55-56. The Golden Age. Roman literature of the classical period, particularly the work of Caesar, Cicero, and Virgil. Prereq.: Lat. 6 or its equivalent. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

Russian

Register for the following as Ru. 1, etc.

*1-2. Elementary Russian. Elements of Russian grammar, reading of graded prose, and oral use of the language. 3 lec.; 3 cr. *(Students who offer two entrance units [two years of high-school work] in a language will not be permitted to register for the first semester of that elementary language course for credit. They may, however, audit the course with proper authorization.)* This course cannot be counted for major credit.

3-4. Intermediate Russian. Intensive and extensive reading of complete texts of intrinsic literary and intellectual worth, formal review of the structure of the language, training in oral and written expression of ideas. Classroom discussion and papers in Russian. 3 lec.; 1 lab.; 3 cr. *Open by placement examination, and to students who have passed Russian 2 with a grade of C.*

5-6. Russian Literature and Thought. Reading and analysis of significant works in Russian literature and thought. Outside readings on the historical and cultural background of the works read. Papers and discussion in Russian. Term paper in English. 3 lec.; 3 cr. *This course or its equivalent prerequisite to all higher courses in Russian. Open to students who have achieved a grade of A or B in Russian 2 by permission of the department, to students who have achieved a grade of C or better in Russian 4, and by placement examination.*

Spanish

Register for the following courses as Sp. 1, etc.

New students will be assigned to Spanish 1, Spanish 2, Spanish 3, Spanish 4, or Spanish 5, on the basis of their scores on the Spanish reading examinations.

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* No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

*1-2. Elementary Spanish. For students without previous knowledge of Spanish. Aural-oral practice, and the study of fundamental speech patterns, reading and writing to achieve a firm basis for an active command of the language. *No credit toward a major.* 5 rec.; 2 lab.; 5 cr. *(Students who offer two entrance units or two years of high school work in Spanish, and who do not qualify for Spanish 3 will not be permitted to register for credit for Spanish 1. They may, however, audit the course with proper authorization and register for credit for the second half of the course, Spanish 2.)*

3-4. Intermediate Spanish. Intensive and extensive reading of complete texts of intrinsic literary and intellectual worth, formal review of the structure of the language, training in oral and written expression of ideas. Classroom discussion and papers in Spanish. 3 rec.; 1 lab.; 3 cr. *Open by placement examination, and to students who have passed Spanish 2 with a grade of C. Students making a grade of A in Spanish 4 may take courses numbered 50 and above with the permission of the department.*

5-6. Introduction to Spanish Literature and Thought. Reading and analysis of significant works in Spanish literature and thought. Organized around such topics as "Self and society", "God and man", "Order and change in society", etc. Outside readings on the historical and cultural background of the works read. Papers and discussion in Spanish. Term paper in English. 3 lec.; 3 cr. *This course or its equivalent prerequisite to all higher courses in Spanish. Open to students who have achieved a grade of A or B in Spanish 2 by permission of the department, to students who have achieved a grade of C or better in Spanish 4, and by placement examination.*

31, 32. Advanced Spanish Conversation and Composition. For students who wish to perfect their command of written and spoken Spanish, maintain aural-oral fluency in Spanish through intensive work in and out of the classroom, individual conferences, and laboratory sessions. Mr. Casas. Prereq.: Span. 3 or 4 or equivalent. 3 lec.; 2 ½-hr. lab.; 3 cr. (Not offered 1962-63.)

51. Spanish Literature up to 1600 and Cervantes. Readings and discussion of the great human creations of early Spanish literature such as El Poema del Mio Cid, El Libro de Buen Amor, La Celestina and Don Quixote, and their social and historical background. The first part covers early Spanish literature up to Cervantes. The second part is devoted entirely to Cervantes: his life, drama, Novelas Ejemplares, and his masterpiece Don Quixote. Prereq.: Sp. 5 or equivalent. 3 lec.; 3 cr. (Not offered 1962-63.)

52. Drama and Poetry of the Siglo de Oro. The social background of the baroque period. Readings of the representative plays of Lope de Vega, Calderon, Alarcon, Tirso de Molina, and the poetry of Gongora and Quevedo. Development of the prose of the period. Prereq.: Sp. 5 or equivalent. 3 lec.; 3 cr. (Not offered 1962-63.)

55. Literature of the Nineteenth Century. Preliminary survey of the eighteenth century and readings and discussion of the main literary movements and writers of the nineteenth century such as Quintana, Espronceda, Zorrilla, Larra, Duque de Rivas, Becquer, Perez Galdos, Valera, Pereda, Clarin, and Echegaray. Social and historical background of Spain in relation to nineteenth century thought in Europe. Mr. Casas. Prereq.: Sp. 6 or equivalent. 3 lec.; 3 cr. (Not offered 1962-63.)

56. Contemporary Spanish Literature. Starting with the generation of 1898 this course covers the readings and discussion of the work of such

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* The content of Spanish 1 is equivalent to Spanish 1-2 and Spanish 2 is equivalent to Spanish 3-4 under the former 3-credit system.

No student from a foreign country will be permitted to register for any language course numbered 4 or below (except Greek 1-2, 3-4) in such student's native language.

writers as Unamuno, Azorin, Baroja, Machado, J. R. Jimenez, Ortega y Gasset, Garcia Lorca, Perez de Ayala, Casona, Benavente, and a survey of Spanish literature and thought since 1939. Mr. Casas. Prereq.: Sp. 6 or equivalent. 3 lec.; 3 cr. (Not offered 1962-63.)

65, 66. Spanish-American Literature. The main themes of Spanish-American literature through the reading of the works of the most representative authors along with an historical, social and geographical background of the New World. Mr. Casas. Prereq.: Sp. 6 or equivalent. 3 lec.; 3 cr. (Offered 1962-63.)

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

FORESTRY

Paul E. Bruns, *Professor;* Clark L. Stevens, *Professor;* Lewis C. Swain, *Professor;* Oliver P. Wallace, *Associate Professor;* Harold W. Hocker, Jr., *Assistant Professor;* Peter H. Allen, *Assistant Professor*

General Courses

1. Forestry Principles. Fundamentals of forestry as applied to the orderly handling of woodlands. Mr. Swain. Elective for all students, except Forestry majors. 2 lec.; 1 lab.; 3 cr.

38. Nature Education. Outdoor education methods, materials, and equipment. Discussion of activity programs involving forests, soils, water, and wildlife, with the recreational and educational possibilities of each. Mr. Stevens. Required for women in Physical Education. Recreation Education Option. Elective for other women students. Prereq.: Junior standing and permission of the instructor. 2 lec.; 1 lab.; 3 cr.

Forest Game Management

34. Forest Fish and Game. The characteristics of the more important species present in northeastern forests, together with some consideration of the management techniques applicable to each. Mr. Allen. For juniors in Forestry. Elective for others with approval of the instructor. 2 lec.; 1 lab.; 3 cr.

55, 56. Forest Game Management. Readings and discussions on the properties of game populations, and the various phases of management, including public relations. The principles of forest management, and the preparation of a working plan for the management of forest and wildlife resources on a specified area. The student may be required to spend several week-ends working with the State Fish and Game Department, helping with investigational projects. Mr. Stevens. For seniors in Wildlife Management. 2 lec.; 1 4-hr. lab.; 4 cr.

Forestry

25. Dendrology. The identification of trees in the field, in autumn and in winter. The principal forest regions of North America, their location, extent, and climatic conditions, as well as the characteristic flora and fauna of each. The forest types of the northeastern United States. Mr. Stevens. Required of freshmen in Forestry. Elective for others. 1 lec.; 1 lab.; 2 cr.

27. Silvics. The ecological basis of silviculture. Classification of forest

communities; environmental factors and their influence on forest vegetation; influence of vegetation on environmnt. Mr. Hocker. Prereq.: Bot. 1, 6. 2 lec.; 1 lab.; 3 cr.

28. Applied Statistics. Statistical procedures with emphasis on biometrics. Computational procedures and interpretation of results will be covered in lecture and laboratory. Prereq.: 6 cr. of Math. 2 lec.; 1 lab.; 3 cr.

29. Silviculture. The theory and techniques of applying ecological knowledge to the control of establishment, composition, and growth of forest stands for economic purposes. Field practice including marketing of stands for various kinds of cutting and cultural treatment. Mr. Hocker. Prereq.: For. 25; For. 27 or Bot. 42. 2 lec.; 1 lab.; 3 cr.

30. Silviculture. Forest tree improvement, reproduction, collection and testing of forest tree seed, nursery management and out-planting of seedlings, direct seeding of forest stands, planting site surveys. Mr. Hocker. Prereq.: For. 27. 2 lec.; 1 lab.; 3 cr.

43. Forest Mensuration. Theory and practice in the principles of forest mensuration. A consideration of forest inventory, study of growth and yield, and volume table construction. The application of statistical procedures to forest mensuration. Prereq.: For. 23. 2 lec.; 2 lab.; 4 cr.

44. Forest Economics. Application of economics and finance to the forest business. Nature of forest investments, forest taxation, and forest resources. Mr. Wallace. Prereq.: 3 cr. of Math; Econ. 1. 3 lec.; 3 cr.

51, 52. Forest Utilization. Methods of logging and milling in the chief lumber-producing regions of the United States; forest products, their manufacture and markets; special problems of the lumber business. Mr. Swain. Prereq.: Permission of the instructor. 2 lec.; 1 4-hr. lab. 4 cr.

57. Aerial Photogrammetry in Forestry. Elementary principles of photogrammetry with emphasis on their application to all phases of forestry. The value and use of aerial photos in forest typing, planimetric, and topographic mapping; measurement of area and volume estimation. Prereq.: 3 cr. of Math. and permission of instructor. 2 lec.; 2 lab.; 4 cr.

59. Forest Protectoin. Principles of protection from fire, insects, fungi, climatic extremes, and other injurious agencies. Principles are illustrated by protection of northeastern forests. Emphasis is placed upon the development of resistant forest stands. Mr. Allen. Prereq.: Permission of instructor: 2 lec.; 1 lab.; 3 cr.

61, 62. Problems in (a) Forest Ecology; (b) Photogrammetry; (c) Forest Utilization; (d) Wildlife; (e) Mensuration; (f) Forest Economics; (g) Forest Management. Work to be arranged according to the needs of individual students. Staff. Prereq.: Senior standing and permission of the instructor. Hours to be arranged. 2 to 4 cr.

63. Forest Recreation. The extent, developments, and conflicts in the recreational use of wild lands of North America. Relationships to the conservation of natural resources are considered. Elective for juniors and seniors. Mr. Wallace. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

64. Forest Industry Economy. Economy in productive enterprise—logging and manufacturing of forest products; control of harvesting costs as a factor in intensifying applied forest management; planning for minimum cost operations. Mr. Wallace. For seniors in Forestry. Prereq.: 3 cr. of Math.: Forestry 44 and 51. 2 lec.; 1 lab.; 3 cr.

66. Wood Identification. The uses of lumber; physical properties and identification of the commercially important woods. Mr. Swain. Prereq.: Permission of the instructor. 2 lec.; 1 lab.; 3 cr.

(69.) Forest Management. The management of forest areas for multiple use on an economic and ecological basis. The integration and application of business methods and the technical phases of forestry. Mr. Bruns. Prereq.: For. 29, 43 and 44. 3 lec.; 1 lab.; 4 cr.

Summer Session

41. Game Management Field Practice. Summer camp course. Field work on the University Forest at Passaconaway, N. H., and on a game management area of the White Mountain National Forest. Mr. Stevens. For students in Game Management group. Elective for others by permission of the instructor. Forty hours per week for 8 weeks. 10 cr.

42. Forest Engineering. Field practice at summer camp in forest mapping and surveying. Prereq.: For. 28, C.E. 7. Forty hours per week for 3 weeks. 4 cr.

45. Timber Survey. Field practice at summer camp in forest inventory. Field work in the application of silvicultural principles and field trips for observation and study of current practices being used on private and public forest lands. Emphasis given to commercial tree species of the northern hardwood and spruce-fir forest types. Mr. Wallace and Mr. Hocker. Prereq.: For. 43. Forty hours per week for 5 weeks. 6 cr.

53. Wildlife Ecology Problems. Summer camp course. Special problems in the ecology of forest fish and game. Mr. Stevens. Open to advanced students or to those who show unusual promise in wildlife research. Prereq.: Permission of the instructor. Forty hours per week for 3 weeks. 10 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

FRENCH

(See Foreign Languages and Literatures)

GEOLOGY AND GEOGRAPHY

Jerome M. Pollack, *Assistant Professor;* T. Ralph Meyers, *Professor;* Donald H. Chapman, *Professor;* Glenn W. Stewart, *Associate Professor;* Cecil J. Schneer, *Associate Professor;* William H. Wallace, *Associate Professor*

Geology

1-2. Principles of Geology. The earth and its history. A consideration of land forms and a discussion of the materials and structures of the earth's crust. The interpretation of past geologic events, and their effect on the development of life forms. Mr. Meyers, Mr. Chapman, Mr. Stewart, and Mr. Pollack. 3 lec.; 1 lab.; 4 cr. *This course cannot be used for major credit.*

7. General Geology. An introductory course in physical geology. The structures and materials of the earth's crust and the forces which have produced and altered them. Mr. Stewart. For students in Technology and Agriculture. *Open to Liberal Arts students by permission only.* 2 lec.; 2 cr. (Not available for credit after completing Geol. 1.)

27. Physical-Chemical Mineralogy. An introduction to the theory of natural solids; the structure of the atom; the crystal, its geometry, its physics and chemistry, its natural history; methods of physical-chemical mineralogy. Mr. Schneer. Prereq.: Chem. 4. 2 lec.; 1 lab.; 3 cr.

28. Descriptive and Determinative Mineralogy. The physical and chemical properties of minerals, their associations, modes of occurrence and uses; with training in their identification. Mr. Meyers. Prereq.: Geol. 1 or 7. 2 lec.; 2 lab.; 4 cr.

31. Geomorphology. The factors producing the present aspect of the land surface, particularly that of New England. Special emphasis on the work of running water, glaciers, and marine agents. Field trips during the fall season. Mr. Chapman. Prereq.: Geol. 2 or permission of the instructor. 3 lec.; 1 lab.; 4 cr.

32. Glacial Geology. The characteristics of existing glaciers and an interpretation of Pleistocene glacial features. The abundant and varied evidence of glaciation in northeastern North America and Baltic Europe will be emphasized. New Hampshire examples of both Alpine and Continental glaciation will be studied in the field. Mr. Chapman. Prereq.: Geol. 2. 2 lec.; 1 lab.; 3 cr.

33. Structural Geology. The structural units of the earth's crust and the mechanics of their formation. Mr. Stewart. Prereq.: Geol. 2 and Math. 7-8, Fundamental Mathematics, or permission of the instructor. 3 lec.; 1 lab. or field work; 4 cr.

34. Elements of Petrology. The origin, modes of occurrence, and classification of rocks. Mr. Stewart. Prereq.: Geol. 2 lec.; 1 lab. or field exercise; 3 cr.

36. Sedimentology. The properties of sediments and sedimentary rocks, the sedimentary processes and environments, correlation procedures and stratigraphic principles. Mr. Pollack. Prereq.: Geol. 1 or permission of the instructor. 2 lec.; 1 lab.; 3 cr.

42. Field Geology. Training in basic field methods of geologic mapping. Mr. Stewart. Prereq.: Geol. 33. 1 lec.; 1 lab. or field work; 2 cr.

53-54. Economic Geology. First semester: the types of coal and their occurrence in the United States; petroleum, the structures in which it is found and the distribution and geology of oil fields, especially in the United States; industrial minerals and their utilization. Second semester; the metals, their ores, and the geology of important ore deposits. Mr. Meyers. Prereq.: Geol. 28. 3 lec.; 3 cr.

55. Invertebrate Paleontology. The classification, evolution, and stratigraphic occurrence of invertebrate animals as recorded by fossils. Field trips will be made to collect specimens and to study environments of living and fossil material. Mr. Pollack. Prereq.: Geol. 2, or permission of the instructor. 3 lec.; 1 lab.; 4 cr.

57, (57). Geological Problems. Special problems by means of conferences, assigned readings, and field or laboratory work, fitted to individual needs from one of the areas listed below. Mr. Meyers, Mr. Chapman, Mr. Stewart, Mr. Schneer, and Mr. Pollack. Prereq.: Pemission of the instructor. 1-2 cr. *This course may be repeated to a total of not more than 5 credits.*

a. Areal Geology
b. Geochemistry
c. Geomorphology, Advanced
d. Geophysics
e. Glacial Geology, Advanced
f. Groundwater Geology
g. Historical Geology, Advanced
h. Industrial Minerals
i. Micropaleontology
j. Mineral Fuels
k. Mineralogy, Advanced
l. Optical Crystallography
m. Ore Deposits
n. Paleontology, Advanced
o. Petrology, Advanced
p. Regional Geology
q. Sedimentation
r. Stratigraphy
s. Structural Geology, Advanced
t. Geology Seminar

Register for the following courses as Geog. 1, etc. Courses in Geography cannot be used to satisfy the Science requirements, nor major requirements in Geology.

1, 2. Regional Geography of the World. A survey of the geography of the world, organized in terms of the major cultural areas of the earth. The Polar, European, and Dry World cultural areas are considered during the first semester; the Oriental, African, Pacific, and New World cultural areas are analysed during the second semester. In each area the unique integration of physical and human features that produces the distinctive personality of the region is studied. Mr. Wallace. 3 lec.; 3 cr.

3. Physical Geography. The differentiation of the earth in terms of climate, landforms, vegetation, and soil; the regional synthesis of these physical features in selected areas. Mr. Wallace. 3 lec.; 3 cr. *This course is not open to students who have taken both Geog. 21 and 22.*

4. Cultural Geography. The geography of man. Differentiation of the earth in terms of population, settlement, and the basic economic activities, including agriculture, forestry, fishing, mining, manufacturing, and transportation. The inter-relations of cultural phenomena and physical features in selected areas. Mr. Wallace. 3 lec.; 3 cr.

(5.) Political Geography. Differences and similarities among the states of the world in terms of political character. Analysis is made of the factors involved in the internal unity of states, as well as their external relations. Attention is focused upon the major world powers of the present period. Mr. Wallace. *Not open to freshmen.* 3 lec; 3 cr. *(This courses will be offered in second semester.)*

10. Geography of Anglo-America. A regional and topical analysis of the United States and Canada. Physical features and human phenomena are studied in terms of their contributions to the character of the area. Mr. Wallace. *Not open to freshmen.* Prereq.: 3 hours credit in Geography or permission of instructor. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

11. Geography of Europe. A regional and topical analysis of the geography of Europe. The basic theme is the unique complex of physical and human features that produces the great diversity of Europe. Mr. Wallace. *Not open to freshmen.* Prereq.: 3 hours credit in Geography or permission of instructor. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

21. The Weather. The interpretation of atmospheric phenomena; the heating and circulation of the atmosphere and the nature and movement of the air masses which influence the weather of North America and particularly of New England. Mr. Chapman. 2 lec.; 2 cr.

22. Climates of the World. Classification of climates of the world. Examples and brief descriptions of major climate types, and their influence on the life of man. Mr. Chapman. 2 lec.; 2 cr.

57, (57). Meteorological or Geographical Problems. Special problems by means of conferences, assigned readings, and laboratory work, fitted to individual needs. Mr. Chapman and Mr. Wallace. Prereq.: Permission of the instructor. 1-5 cr. *This course may be repeated to a total of not more than 5 credits.*

Physical Science

(Register for this course as Ph. Sci. 1-2.)

1-2. The Evolution of Physical Science. The principles and methods of physical science illustrated by the development of major scientific ideas in the physical world. The course is directed toward an understanding of the intellectual achievements and problems of science as part of culture. Mr. Schneer. 3 lec.; 1 lab.; 4 cr.

GERMAN

(See Foreign Languages and Literatures)

GOVERNMENT

John T. Holden, *Professor;* Robert B. Dishman, *Professor;* Allan A. Kuusisto, *Professor;* David C. Knapp, *Associate Professor;* Robert L. Drake, *Assistant Professor;* George K. Romoser, *Assistant Professor;* Arthur S. Banks, *Instructor;* Robert L. Bradford, *Instructor*

All students majoring in Government must take Government 5 and 6. These two courses qualify the student for his major but may not be counted for major credit.

5, (5). Elements of Political Science. An introduction to politics and government in modern society. The scope and method of political science, the behavior of the individual and group in political society, the nature and structure of political power, and competing political ideologies, e.g., communism, elitism, democracy. Staff. Open to all students. 3 lec.; 3 cr.

(6), 6. Principles of American Government. The origins and development of the national government in the United States. The role which legislators, administrators, judges, and the people themselves play in the governmental process and on the constitutional and political framework within which they operate. Staff. Open to all students. 3 lec.; 3 cr.

8. America in World Affairs. The problems of American foreign relations. The formulation and execution of policy, the emergence of the United States as a world power, contemporary issues confronting the country, and policies adopted to meet the issues. Mr. Kuusisto, and Mr. Bradford. Open to all students. 3 lec.; 3 cr.

11, 12. Comparative Government. A comparative study of the structure and functions of the governments of the major world powers. Great Britain, France, and Germany are considered during the first semester; second semester, Soviet Union, China, India, and Japan. Mr. Banks and Mr. Bradford. Not open to freshmen. 3 lec.; 3 cr.

13. State Government and Politics. A comparative, historical and theoretical examination of the role played by the states and their governmental subdivisions in the American federal system. The relation between structure and politics in state government, and the effect of this relationship on the executive, legislative, and judicial powers. The special areas of intergovernmental relations, regional cooperation, metropolitan growth, state reorganization, fiscal management taxation, and the theories of cooperative federalism and state's rights. Mr. Drake. Prereq.: Gov. 6. 3 lec. 3 cr.

14. Local Government and Politics. An examination of the institutions of local government in the United States, their historical background, and the social, economic, and political environments in which they operate. Particular emphasis is placed on the urban political process and power structures. Examination of municipal planning and some of its devices, i.e., zoning, building codes, and urban renewal are included. Prereq.: Gov. 13. 3 lec.; 3 cr.

15. Political Parties and the Electoral Process. Political parties as an instrument for the popular control of government in the United States. The way in which parties are organized, the methods by which they nominate candidates and campaign for their election, and the groups from which they draw most of their electoral support. Mr. Dishman. Prereq.: Gov. 6. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

51. Administration of Justice. The nature, sources and problems of the law as distinguished from other forms of social control. The course is analytical and critical, tracing the origin and development of legal institutions from primitive times to the present and evaluating the modern role of judge, jury, and counsel in the administration of justice. The law in action i.e., law as it is applied by courts and practiced by lawyers rather than as it is formulated by the legislative and executive branches. Mr. Dishman. 3 lec.; 3 cr.

52. The Supreme Court and the American Constitution. The American Constitution, stressing the basic constitutional principles on which the American political system is founded and their application to present-day social, political, and economic problems. The powers of Congress, the President, and the federal courts and the constitutional limitations by which their respective powers are checked. Mr. Dishman. Prereq.: Gov. 6. 3 lec.; 3 cr.

54. Pressure Groups and the Governmental Process. Political interest groups as an unofficial "third house" of American national and state legislatures. The efforts by pressure groups to influence public officials by lobbying, propaganda, and direct political action. Mr. Dishman. Prereq.: Gov. 6. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

55. World Politics. The basic driving forces in international relations, including the nature of political power and its extension or limitation. Geopolitics, nationalism, ideology, imperialism, international economic relations, balance of power, warfare, regulation of arms, international law, and collective security. Mr. Holden. 3 lec.; 3 cr.

56. Foreign Policies of the Great Powers. Fundamental factors influencing contemporary foreign policy formulation of the United States, the Soviet Union, the British Commonwealth, and other significant powers. Problems and choices confronting policy makers of these powers in dealing with issues involving the United Nations, regional organizations, Western Europe, Middle East, and Asia. Mr. Kuusisto. 3 lec.; 3 cr.

57. The Administrative Process. The principal concepts of governmental administration, including theories of organization, administrative leadership, internal management, and administrative responsibility and control. The relationship of group behavior and policy development to the administrative process. Mr. Drake. Prereq.: Gov. 6 or Soc. 1. 3 lec.; 3 cr.

58. Natural Resources Policy and Administration. The development and administration of public policy on land, water, and mineral resources. The historical development of governmental action in each of these areas, political conflicts on policy goals, and the administrative structure for carrying out current policies. Prereq.: Gov. 6. 3 lec.; 3 cr. (Not offered 1962-63.)

63. Political Thought in the West. The principal political theories from Plato and Aristotle to the beginning of the modern liberal tradition. The growth and development of political thinking and institutions in terms of the development of modern government. The development of the modern national state and the current challenge to its fundamental institutions. Mr. Romoser. 3 lec.; 3 cr.

64. Modern Political Thought. Modern western political thought from the emergence of the nation state to the present. The meaning and growth of the basic patterns of thought on the Continent and in England, including liberalism, democracy, nationalism, socialism, communism, and fascism. The contributions of American political thought as it grew from its English origins to the development of the American constitutional system. Mr. Romoser. 3 lec.; 3 cr.

65, (65). Research in Government Problems. An individual research project in one of the fields of government, e.g., local or state adminstration, comparative government, international relations, international organizations, political theory, politics, or public law to be prepared under the direction of the instructor. Emphasis will be placed on the methods and sources of research in government. Open to senior majors in Government. Mr. Dishman. 3 cr.

67. Public Policy and Regionalism. (Not offered 1962-63.)

69. Contemporary Southeast Asia. A comparative study of the political and social development of Southeast Asia. The significance of the role of independence and dependence; the competing influence of communism and Western democracy; the special significance of the role of China, India, Great Britain, and the United States. The states to be studied include the Philippines, Laos, Cambodia, Viet Nam, Viet Minh, Thailand, Burma, Malaya and Indonesia. Mr. Holden. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

97, (97). Seminar in Government. A selected current topic from government, political philosophy and history, political behavior, public law, public administration, or international relations will be the vehicle for this seminar. Special emphasis will be given in 1962-63 to an area approach (Southeast Asia for example) in the study of international relations. Each student is held responsible for a specific phase of the selected problem. He will also, through the techniques of the seminar, acquaint himself with the whole project. The course is restricted to undergraduates with honor grades and graduates students in Social Science. Advance copies of the syllabus may be secured from the Chairman of the Department. Permission of the instructor is required. Mr. Holden, Mr. Dishman, Mr. Kuusisto, Mr. Drake, Mr. Romoser, Mr. Bradford. 3 lec.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

GREEK

(See Foreign Languages and Literatures)

HISTORY

PHILIP M. MARSTON, *Professor;* WILLIAM YALE, *Professor Emeritus;* DAVID F. LONG, *Professor;* GIBSON R. JOHNSON, *Associate Professor;* ALLAN B. PARTRIDGE, *Associate Professor;* HANS HEILBRONNER, *Associate Professor;* ROBERT C. GILMORE, *Associate Professor;* CHARLES A. JELLISON, JR., *Assistant Professor;* WILLIAM GREENLEAF, *Assistant Professor;* MARION E. JAMES, *Assistant Professor*

In these courses an important place is given to historical reading carried on in the reference room. Often a considerable part of the work is written. The statements in regard to prerequisites are for Liberal Arts students. Agriculture and Technology students should consult the Department Chairman.

Basic Course

The following is a basic course which is required of all students in the College of Liberal Arts.

1, 2. INTRODUCTION TO CONTEMPORARY CIVILIZATION. A background of appreciation of the significance of man's environment, the nature of man, the cultural heritage from the past, recognition of historical allusions in literature and conversation, and knowledge of the general sequence of historic events. Prehistoric and historic social evolution. The historic explanation of modern life and an appreciation of the problems of contemporary society. Mr. Gilmore, Mr. Greenleaf, Mr. Heilbronner, Miss James, Mr. Jellison, Mr. Johnson, Mr. Long, and Mr. Partridge. 3 lec.; 3 cr. *This course cannot be used to satisfy major requirements.*

Group A

11, 12. THE MEDITERRANEAN WORLD IN ANCIENT AND CLASSICAL TIMES. The contributions made by the peoples of the Ancient Near East, the Hellenic and Hellenistic civilizations, and the Romans to Western civilization. Miss James. *Not open to freshmen.* 3 lec.; 3 cr. (Not open to students who have credit for the former History 11, 12, 13.)

19, 20. MODERN EUROPEAN HISTORY. Europe from the end of the Middle Ages to our own times. The evolution of the national state; international relations; the expansion of Europe overseas; and the background of our modern Western civilization especially its ideas, literature and art. A basic course for those who wish to proceed further in the study of European history as well as a survey for those who are interested in special aspects of Western cultural development. Mr. Gilmore. *Not open to freshmen.* 3 lec.; 3 cr.

21, 22. HISTORY OF ENGLAND. The history of the British Isles from earliest times to the present, and a consideration of the British Empire and Commonwealth of Nations. A parallel to English literature, a background to American political history, and a study of English culture and institutions in the democratic and social integration of the world. Mr. Partridge. *Not open to freshmen.* 3 lec.; 3 cr.

31, 32. ASIA IN TRANSITION. The old and the new China, Japan, and India. A general introduction to the changes taking place in Asia. The impact of Europe, Russia, and America in the East. The response of the East in the form of political and cultural evolution and revolution. The rise and development of Chinese Communism. A basic course for those interest-

ed in cultural, political, industrial, or business developments in the East, and a general course for an understanding of the East. Mr. Johnson. *Not open to freshmen.* 3 lec.; 3 cr. *(Formerly Hist. 75, 76.)*

65, 66. Medieval History. History of Europe and the Mediterranean area from the late Roman Empire to the Renaissance. 3 lec.; 3 cr.

71, 72. History of Russia. The development of the Russian state from its foundation to its present status as a world power. The course is designed to increase the understanding of the present in terms of the past. Political developments, foreign relations, and intellectual and ideological currents. Mr. Heilbronner. 3 lec.; 3 cr.

Group B

7, 8. History of the United States. American history from Washington's first administration to the present. Political, social, economic, and diplomatic aspects. Mr. Greenleaf and Mr. Long. *Not open to freshmen.* 3 lec.; 3 cr.

9, 10. Latin-American History. The development and influence of Spanish and Portuguese culture as a wide spread world force; the history of the Latin-American peoples; the relationship of Latin America to North America, particularly in view of recent growth in friendly and diplomatic relations. Mr. Partridge. *Not open to freshmen.* 3 lec.; 3 cr.

51, 52. Colonial and Revolutionary American History. Colonial beginnings in America, national rivalries, the English colonies, the Revolution, and our national life to 1789. Early forms of Americanism in the making. Mr. Marston. 3 lec.; 3 cr.

83, 84. The Foreign Relations of the United States. Primarily the history of American diplomacy, with attention given to the non-diplomatic aspects of foreign relations. Mr. Long. 3 lec.; 3 cr.

85, 86. Twentieth-Century America. United States history since 1896, from the triumph of industrialism on the national scene to the emergence of America as a world power in the nuclear age. Political, economic, and diplomatic developments. Mr. Greenleaf. 3 lec.; 3 cr.

87, 88. Nineteenth-Century America. The historical factors, both domestic and international, involved in the development of the American Republic, its institutions and people, from the inception of the new nation in 1789 to the emergence of the United States as a world power in 1900. Mr. Jellison. 3 lec.; 3 cr.

Group C

23, 24. Historical Origins and Development of Christianity. The life, literature, religion, and social development recorded in the Old Testament as a cultural background. The historic data existing concerning the life, character, and teaching of Jesus. The growth and expansion of the Christian movement. Designed to furnish students an opportunity to evaluate their own religious heritage in the light of contemporary thought. Mr. Johnson. *Not open to freshmen.* 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

25. History of Religion. The leading ideas and practices, historically regarded as religious, with a view to working out an historically valid conception as to the nature of religion. The impact of the scientific revolution upon the supernatural world view and the consequent relegating of religion to a secondary place. The modern naturalistic world view as an intellectual basis for religious living, and traditional Christian beliefs in the terminology of our age. Mr. Johnson. *Not open to freshmen.* 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

26. History of Religions. The principal religions of the world; Hinduism, Buddhism, Zoroastrianism, Confucianism, and Mohammedanism. The history, literature, and philosophy of Oriental civilization and culture as a background. Mr. Johnson. *Not open to freshmen.* 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

History-Education 91. Problems in the Teaching of High-School History and Other Social Studies. Bibliography and new interpretations of history; the social studies curriculum, past and present; aims and objectives in the social studies; selection and organization of teaching material; teaching and testing technique. Teaching American History and the Problems of American Democracy. Open to students who have satisfactorily completed Hist. 7, 8; six credits in other history courses *(exclusive of Hist. 1, 2);* six credits from Gov. 6, Econ. 1, or Soc. 1; and Educ. 58 with grade of C or better. 3 lec.; 3 cr. *This course may not be used to satisfy major requirements.* (Not offered 1962-63.)

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

HOME ECONOMICS

Marjory A. Wybourn, *Professor;* Sarah Thames, *Associate Professor;* Elizabeth Rand, *Associate Professor;* Frances Platts, *Associate Professor;* Ruth Pearce, *Assistant Professor;* Dorothy Wills, *Assistant Professor;* Sandra Kimball, *Instructor*

Child Development and Home and Family Living

25-26. Child Development. The development and guidance of the child from the prenatal to the adolescent period, with emphasis on the preschool child through observation and work at the University Nursery School. Study of children in other situations may be included during the second semester. *Not open to freshmen.* 2 lec.; 1 lab.; 3 cr.

81, 82. Projects in Child Development. Discussion conferences and supplementary projects based upon special interests of the student. Work with children in the University Nursery School or in other situations. Prereq.: H.E. 25-26 and permission of the instructor. 1-3 cr.

83. Family Development. Family growth through predictable stages of development which can be understood in terms of the development of the individual members and of the family-as-a-whole. The characteristics of the American family life cycle in mid-twentieth century; the family from its inception at marriage through the period of expansion, the middle and later years. Services needed for family stability and success. 3 lec.; 3 cr.

84. Personal, Family, and Community Health. The principles which promote healthful living and their application to members of the family and to routine home nursing care. 3 lec.; 1 lab.; 2 cr. 8 weeks.

Clothing and Textiles

4. Textiles. The textile fibers and their characteristics, natural and manmade, as related to their selection, care, and ultimate use of textile materials, functionally and esthetically. Permission of instructor. 2 lec.; 1 2-hr. lab.; 3 cr.

5. Clothing Construction. Basic principles of clothing construction are taught with emphasis on use of new methods. Students become aware of the effectiveness of line, proportion and color; become familiar with the names, characteristics, and care of common fabrics, and acquire experience in the development of time-saving procedures and perfection of skills. Three sections: one for Home Economics majors, two for non-majors. Permission of instructor. 2 lec.; 1 2-hr. lab.; 3 cr.

31. Interior Design. An application of the principles of design to the decorating of the home. Not open to Home Economics majors. Prereq.: Arts 23. 3 lec.; 3 cr.

32. Interior Decoration. An application of the principles of design to the decoration of the home together with laboratory experience in the construction of home furnishings or renovation of furniture Prereq.: Arts 23 and H.E. 5. 1 lec.; 2 labs.; 3 cr.

40. Flat Pattern. The principles of developing designs from a basic pattern by the flat pattern method and the development of original patterns and garments. Prereq.: H.E. 5. 2 lec.; 1 lab.; 3 cr.

43. Draping. Basic principles of fabric manipulation in the draping processes and the evolution of patterns and garments through this method. Prereq.: H. E. 5. 2 lec.; 1 2-hr. lab.; 3 cr.

46. Institutional Textiles. Selection of fabrics for institutional use. New developments in serviceability, care, and costs of institutional textiles and appointments. Prereq.: Permission of instructor. 2 lec.; 1 lab.; 3 cr.

61. Tailoring. The appreciation and application of tailoring principles to making and buying a tailored garment. Prereq.: H.E. 5, and one of the following: H.E. 40 or 43. 2 lec.; 1 2-hr. lab.; 3 cr.

65. History of Costume. An appreciation of costume (and textiles) from primitive times to the present and the relationship of the mores of each period to the development of the costume for the respective era. 3 lec.; 3 cr.

66. Costume Design and Fashion Illustration. The development of some skill in the delineation of fashion figures, and the sketching of original costume designs derived from various sources of inspiration. Prereq.: H.E. 5. H.E. 65 is recommended. 2 2-hr. labs.; 2 cr.

(67). Fundamentals of Fashion. Economical, psychological, and sociological problems inherent in the field of fashion. The development of the fashion industry. Prereq.: H.E. 5 and H.E. 40 or 43. 2 labs.; 2 cr.

69. Advanced Textiles. Investigation and evaluation of fabrics in everyday use. Consumption of textiles with emphasis on economic and social implications. Prereq.: H.E. 4. Hours to be arranged. 3 cr.

Foods and Nutrition

(12) 12. Foods. The application of the principles involved in the purchase and preparation of food. Menu planning, meal preparation, and field trips to nearby food service centers. For Non-Home Ec. majors. 2 lec.; 1 lab.; 3 cr.

(13), 13. Principles of Food Selection and Preparation. The scientific principles involved in selection, composition, preparation, preservation, and economics of food. Recent food developments, such as mixes and newer methods of preparation. Concurrently with Chem. 1 or 3, 2 or 4. 2 lec.; 1 2-hr. lab.; 3 cr.

(19). Menu Planning and Service. The planning, preparation, and service of meals with emphasis on food economics and the efficiency and utilization of new methods and equipment. Prereq.: H.E. 13. 2 lec.; 1 lab.; 3 cr.

71. Experimental Foods. Techniques of research and technological advances in the preparation and preservation of foods. Experiments with specific foods in the laboratory. Prereq.: H.E. 18; Bio. Chem. 6, Bio. Chem. 56 or permission of instructor. 2 lec.; 1 2-hr. lab.; 3 cr.

73. Nutrition. The fundamental principles of the physiological and social sciences and their relationships to human nutrition. The nutritive value of foods, essential nutrients which promote growth and health, effect of food on the body, and adjustment of diet to varying income levels. Prereq.: H.E. 18. Bio. Chem. 6, Chem. 45 or permission of the instructor. 2 lec.; 1 lab.; 3 cr.

74. Nutrition in Health and Disease. Modifications of the normal diet and how nutrition is used as a therapeutic measure in the treatment of disease. Prereq.: H.E. 73. 2 lec.; 1 lab.; 3 cr.

75. Advanced Foods. The chemical and physical properties of foods and discussion of current research. Prereq.: H.E. 18; Bio.Chem. 6 or permission of instructor. 2 lec.; 1 lab.; 3 cr.

76. Nutrition Seminar. Discussion of research and experimental work in human nutrition. Exploration of current periodicals, reports, and assigned readings. Prereq.: Permission of the instructor. 3 lec.; 3 cr.

86. Food Trends and Developments. The newest developments in food production, selection, preparation, and preservation. Electronic cookery; the preparation, use, and evaluation of new home and institutional mixes; and modern trends in the planning, preparation, and serving of "jiffy" meals will be presented in lecture, demonstration, and laboratory sessions. Field trips to nearby food service centers will be planned for the group. 3 lec.; 1 lab.; 4 cr.

Home Economics Education

91. Methods in Home Economics Education. The objectives and methods of Home Economics education. Their applicability to a variety of situations and media. Prereq.: Educ. 57-58, 59. 2 lec.; 1 lab.; 3 cr.

93. Nutrition Education. The principles, procedures, and problems involved in the educational program for dietitians and nutritionists. Prereq.: H.E. 73, 74, and Psych. 1. 3 lec.; 3 cr.

94. Supervised Teaching in Home Economics. Eight weeks of supervised teaching. Prereq.: Educ. 57-58, 59, and H.E. 91. 7 cr.

96. Seminar in Home Economics Education. Problems encountered by students after having completed supervised teaching. Assigned readings and discussions of the current literature in the field of home economics education. For seniors majoring in Teacher Preparation. Hours to be arranged. 3 cr. Offered last eight weeks of second semester.

98. Preparation and Evaluation of Illustrative Materials. The preparation of display cases, bulletin boards, posters, and other illustrative materials pertaining to home economics. Each student will have an opportunity to work in her major area. Open to juniors and seniors in Home Economics. 2 lec.; 2 lab.; 2 cr. Offered last eight weeks of second semester.

Home Management

87. Home Management. The management of human and material resources in daily home living. Open to juniors and seniors. 2 lec.; 1 lab.; 3 cr.

88. Home Management Residence. Management principles in the operation of the home. Students live in the Elizabeth DeMerritt House for a period of seven weeks. Married students registering for H.E. 88, and residing with their husbands, may fulfill the requirements of the course by living in the House or by carrying out a supervised program in their own home. Those not residing with their husbands at the time the course begins shall live in the House for the course period. Prereq.: H.E. 87 and permission of instructor. For juniors and seniors. 3 cr.

Housing and Equipment. (See Agricultural Engineering 2.)

Institutional Administration

21-22. Quantity Foods and Purchasing. The quantity production and buying of food. Principles of large quantity methods and standards as applied to hotels and institutions. Laboratory work in the quantity cookery laboratory and University Dining Hall kitchens. Prereq.: H.E. 18. 1 lec.; 1 4-hr. lab.; 3 cr.

53. Organization and Management of Institutional Food Service. Problems of personnel policies, menu planning, production and merchandising, plant planning, maintenance, and sanitation as related to institutional food service. Prereq.: H.E. 21-22. 3 lec.; 3 cr. This course may be taken concurrently with H.E. 55.

55, (55). Institutional Accounting and Foods Control. Methods of controls and systems of food cost accounting used in food service operations. Prereq.: H.E. 53 or may be taken concurrently with H.E. 53. 2 lab.; 2 cr.

Field Work

(48), 48. Field Work. Residence and experience in an approved hospital or other type of institution required for students majoring in Foods, Nutrition, and Institutional Administration. Field work experience may be elected by other Home Economics majors. Prereq.: Approval of adviser. 2-6 cr.

HORTICULTURE

William W. Smith, *Professor;* L. Phelps Latimer, *Associate Professor Emeritus;* Russell Eggert, *Associate Professor;* John T. Kitchen, *Associate Professor;* Owen M. Rogers, *Assistant Professor*

General Horticulture

2. Plant Propagation. Discussion and practice including soil, sand, and peat media; seed treatments, seeding, watering, light, feeding, and temperatures; leafy, softwood, and hardwood cuttings; hormone treatment; budding, root, top and bridge-grafting; seedbed nursery practice. Mr. Rogers and Mr. Smith. 1 lec.; 2 cr.

4. General Horticulture. The principles and practices of horticulture, including fruits, vegetables, and ornamentals, as they apply to both commercial production and the growing of plants in and around the home. Staff. 2 lec.; 1 lab.; 3 cr. (Not offered 1962-63.)

13. Horticultural Products and Judging. Selection of fruits, vegetables, and flowers for exhibition, marketing, and domestic use. The management and judging of small fairs and exhibitions. A wide range of plants and varieties, both fresh and frozen, are used as class material. Required of all Horticulture majors and recommended for others who are training for such

positions as county agricultural agents, home demonstration agents, club leaders, or Smith-Hughes teachers. Mr. Kitchin and Mr. Eggert. 2 lab.; 2 cr.

66. Nursery Management. The development of the nursery business. Factors that influence the location of a nursery, layout of the plant, soil and site, types of plants, pest control, inspection, digging, grading, storage, packing, shipping, and sales. Mr. Eggert. Prereq.: Plant Propagation. 1 lec.; 1 lab.; 2 cr.

91, 92. Horticulture Seminar. A review of current horticultural literature and techniques in horticultural research. Students are required to prepare and present papers on selected topics. Mr. Smith. This course may be repeated for credit. 1 lec.; 1 cr.

94. Plant Breeding. Application of the principles of genetics to practical plant breeding. Hybridization, chemical treatments, and selection as means of producing and improving varieties. Mr. Rogers. Prereq.: Zool. 61. 2 lec.; 1 lab.; 3 cr.

95, 96. Investigations In:

a. Fruits — Mr. Eggert and Mr. Smith
b. Flowers — Mr. Rogers
c. Vegetables — Mr. Kitchin
d. Ornamentals — Mr. Rogers and Mr. Smith
e. Plant Breeding — Mr. Rogers

Elective only after consultation with the instructor in charge. Hours to be arranged. 1 to 4 cr. Course may be repeated for credit.

Fruit Crops

53. Orchard Fruits. Examination of fundamental principles and experimental data and their application to orchard problems, including the establishment of orchards, soil management, water and fertilizer requirements, mineral deficiencies, training and pruning, fruit bud formation, pollination and fruit setting, thinning and winter injury. Mr. Eggert. 3 lec.; 3 cr.

54. Small Fruits. The culture and economic uses of the strawberry, raspberry, blackberry, blueberry, cranberry, and grape. Each fruit is considered with relation to its history, propagation, planting, pruning, harvesting, marketing, insects and diseases, and domestic uses. Mr. Eggert and Mr. Smith. 3 lec.; 3 cr.

55. Systematic Survey of Fruits. Important species and their botanical relationships. The history, distribution, and merits of each species, and the horticultural varieties developed from it. Staff. Prereq.: General Botany. 2 lec.; 2 cr. (Not offered 1962-63.)

Vegetable Crops

57. Systematic Survey of Vegetables. Important species of vegetables and culinary herbs and their botanical relationships. The history, distribution, and commercial merit of each species and the horticultural varieties developed from it. Mr. Kitchin. 2 lec.; 2 cr.

63. The Development of the Vegetable Industry. Similarities and differences in management of vegetable production for fresh market, processing, seed, roadside sales, and home use. The significance of the plant processes of photosynthesis, respiration, and translocation to the vegetable grower. Environmental factors of soil, temperature, and moisture as they

affect vegetable production. The management and role of plant growing structures, seed testing, variety selection, nutrition, weed control, and irrigation in the home garden and commercial plantings. Mr. Kitchin. 2 lec.; 1 lab.; 3 cr.

64. The Commercial Production, Storage, and Marketing of Several Different Vegetable Crops. The management methods of culture, weed control, insect and disease control, nutrition, irrigation, and marketing of different types of vegetables and in different soils. The use of limitations of specialized equipment and chemicals together with a review of recent experimental work in vegetable production. Mr. Kitchin. 2 lec.; 1 lab.; 3 cr.

Ornamentals and Floriculture

27. Landscaping the Home Grounds. The design and maintenance of small properties with emphasis on the principles of arrangement and the use and identification of plant materials in the beautification of home surroundings. Mr. Rogers. 2 lec.; 1 lab.; 3 cr.

37. Floral Arrangement. Floral design and the use of flowers in the home; practice in floral arrangement. A laboratory fee of $5.00 is charged. Mr. Rogers. Prereq.: Permission of the instructor. 1 lab.; 1 cr.

46. Outdoor Flowers. Outdoor flowers that are commonly grown in the temperate region, including climatic requirements, principal varieties, and utilization. Mr. Rogers. Prereq.: Hort. 2 and Bot. 1. 2 lec.; 1 lab.; 3 cr. (Not offered 1962-63.)

59. Greenhouse Management. Modern methods of greenhouse management including soils, watering, costs of production and marketing, and fundamentals of plant behavior under glass. Mr. Rogers. 2 lec.; 1 lab.; 3 cr.

78. Commercial Greenhouse Crops. A survey of the principal greenhouse crops and an intensive study of their individual culture. Mr. Rogerts. Prereq.: Greenhouse Management. 2 rec.; 1 lab.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

HOTEL ADMINISTRATION

Donald E. Lundberg, *Professor*

The courses listed below are primarily for students in Hotel Administration. Other students are invited to elect these courses provided they have the prerequisites.

1. Introduction to Hotel Management. The scope of the hotel business, both resort and commercial. A history of hospitality. The development of resort and commercial operations in the U. S. 2 lec.; 1 cr. *Required of freshmen in Hotel Administration.*

30. Resort Management Practicum. Field work of at least 70 days in the Forest Hills Hotel or similar operation. A weekly seminar, weekly reports, and job studies are parts of the course. Hotel Ad. majors only. 4 cr.

31. Practicum in Commercial Hotel Operation. Field work lasting at least 70 days. This work covers the front of the house including engineering department. Hotel Ad. majors only. 2 cr.

32. Practicum in Commercial Hotel Operation. Field work lasting at least 70 days. This work covers the back of the house and includes the housekeeping department. Hotel Ad. majors only. 2 cr.

33. Practicum in Club Management. Experience on the job of at least 70 days in an approved city or country club. Written reports are required and rotation of work around the front and the back of the club is necessary. Hotel Ad. majors only. 2 cr.

34. Practicum in Institutional Food Service. Field work of at least 70 days duration in an approved school or hospital food service. Job studies and written reports are required. Hotel Ad. majors only. 2 cr.

40, 42, 44, 46. Lectures on Hotel Management. Delivered by representative and well-known men in the hotel business and allied fields. ½ cr. for each course.

55. Hotel Operation. The problems of hotel management. The organization, personnel, and work of the departments, front office procedure, rate structure, and the methods of securing and financing a hotel business. B.A. 9-10 should precede or accompany this course. 3 rec.; 3 cr.

56. Hotel Engineering Problems. Basic principles of electricity and heat; laundry practices and equipment; kitchen planning and layouts; pumps and vacuum systems; water supply and use; fire protection; other mechanical problems of operating hotel or motel buildings. 3 lec.; 1 lab.; 3 cr.

66. Hotel Promotion and Sales. The principles and practices used in building hotel and restaurant sales. Taught by the project method. 2 lec.; 2 cr.

67. Stewarding and Catering. Purchasing, receiving, and storing of foods. Planning and preparation of catered functions. 1 lec.; 1 lab.; 3 cr.

68. Personnel and Labor Relations in Hotels and Restaurants. The application of the principles of personnel management and labor relations to the hotel and restaurant business. 3 lec.; 3 cr.

69. Hotel Honors Seminar. A research and problems course concerned with advancing knowledge in the hotel and restaurant field. 3 lec.; 3 cr.

HUMANITIES

Register for this course as Hu. 1-2.

1-2. Humanities. A course in general education involving the departments of English, Foreign Languages and Literatures, Philosophy, The Arts, and Music. It aims to develop an appreciation of literature, the various arts, and philosophy, and to give an understanding of western cultural traditions. The course will operate within an historical framework but is not intended to be an historical survey. Weekly lectures or demonstrations, readings, slides, films, recordings, class recitations, and discussion. There will be at least one museum trip each semester. Mr. Casas, Mr. Daggett, Mr. Fasanelli, Mr. Maynard, Mr. Asher Moore, and guest lectures. *Not open to freshmen.* 1 lec. and 3 rec.; 3 cr.

ITALIAN

(See Foreign Languages and Literatures)

LANGUAGES

(See Foreign Languages and Literatures)

LATIN

(See Foreign Languages and Literatures)

LIBERAL ARTS

The following courses are non-departmental courses open only to students in the College of Liberal Arts. Register for them as L.A. 51, etc.

51, (51). Senior Synthesis: American Civilization in Transition. To assist the student in integrating the knowledge and skills which he has acquired. The student is put into contact with a variety of ideas and methods which seem important to an understanding of our changing society. Lectures by experts in a variety of academic fields. The ideas, methods, and techniques of integration of these experts constitute the basic data for the course. Each Division of the College of Liberal Arts supplies guest speakers for the course. Mr. Menge, Mr. Nicoloff, and Mr. Bobick. *Prior to registration in L.A. 51, an interview with a member of the course staff is required.* Prereq.: Senior standing in the College of Liberal Arts. One two-hour lecture and discussion period with a guest speaker and two one-hour seminar periods. 3 cr.

97, (97). Independent Study. See description of the plan on page 89. Not less than 6 cr. nor more than 12 cr. for a year.

MATHEMATICS

M. Evans Munroe, *Professor;* Marvin R. Solt, *Professor;* William L. Kichline, *Professor;* Robert J. Silverman, *Professor;* Shepley L. Ross, *Associate Professor;* Robert H. Owens, *Associate Professor;* Edward H. Batho, *Associate Professor;* John C. Mairhuber, *Associate Professor;* A. Robb Jacoby, *Associate Professor;* Donald M. Perkins, *Assistant Professor;* Robert O. Kimball, *Assistant Professor;* Frederick J. Robinson, *Assistant Professor;* David M. Burton, *Assistant Professor;* William E. Bonnice, *Assistant Professor*

2, (2). Intermediate Algebra. The elements of algebra. Intended primarily for students with only one entrance unit of algebra. Prereq.: One entrance unit of algebra. 3 lec.; 3 cr. Does not count for major credit in Mathematics. (Math. 2 is not available for credit in the College of Liberal Arts to those students who have had two units of high school algebra or the equivalent.)

3, (3). Trigonometry. The elements of trigonometry, logarithms. Prereq.: Math. 2 or 2 units of high school algebra and 1 unit of high school geometry. 3 lec.; 3 cr. Does not count for major credit in Mathematics. (Math. 3 is not available for credit in the College of Liberal Arts to those students who have had a half year of high school trigonometry or the equivalent.)

5. Introductory College Mathematics. Enrichment and development of the material presented in the last part of the senior high school mathematics program. Content: Trigonometry, analytic geometry, theory of equations, inequalities, number systems, permutations and combinations; elementary set theory. Prereq.: at least 3 entrance units in mathematics taken exclusively from the fields of algebra, geometry, and trigonometry, and including work in all three of these subjects. 3 lec.; 3 cr. Does not count for major credit in Mathematics.

7-8. Fundamental Mathematics. Introduction to logic, selected topics in mathematical structures; limits, continuity, introduction to calculus; finite mathematics; probability and statistical inference; theory of games. Recommended for non-technical students desiring a year's work in mathematics at the University level. Prereq.: At least 3 entrance units in mathematics taken exclusively from the fields of algebra, geometry, and trigonometry, and including work in all three of these subjects. 3 lec.; 3 cr. Does not count for major credit in Mathematics.

21. Calculus B 1. The derivative and the integral for polynomial functions with applications; review of fractions, exponents, radicals, trigonometric identities, exponential and logarithmic functions; derivative and integral formulas for algebraic and transcendental functions. Students electing calculus will be placed in the 21-22-23 sequence or in the 25-26 sequence on the basis of an achievement test in algebra and trigonometry. Prereq.: 2 years of algebra, 1 year of geometry, ½ year of trigonometry. 3 lec.; 2 rec.; 5 cr. Does not count for major credit in Mathematics.

22. Calculus B 2. Limits and indeterminate forms; lines and conics; use of derivatives in curve sketching; polar coordinates; the modern theory of the differential; applications of integration. Prereq.: Math. 21. 3 lec.; 2 rec.; 5 cr. Does not count for major credit in Mathematics.

23. Calculus B 3. Integration by parts, by partial fractions, and by substitution; iterated integrals and applications; series. Prereq.: Math. 22. 3 lec.; 2 rec.; 5 cr.

24. Differential Equations. Basic concepts, methods, and applications of ordinary differential equations; exact and approximate methods for solving first order equations; higher order linear equations; series solutions; systems of equations; boundary value problems. Prereq.: Math. 10 or 23 or 26. 3 lec.; 3 cr.

25. Calculus A 1. The derivative and the integral for polynomial functions with applications; derivative and integral formulas for algebraic and transcendental functions; limits and indeterminate forms; lines and conics; use of derivatives in curve sketching; polar coordinates. Students electing calculus will be placed in the 21-22-23 sequence or in the 25-26 sequence on the basis of an achievement test in algebra and trigonometry. Prereq.: 2 years of algebra, 1 year of geometry, ½ year of trigonometry. 3 lec.; 2 rec.; 5 cr. Does not count for major credit in Mathematics.

26. Calculus A 2. The modern theory of the differential; applications of integration; integration by parts, by partial fractions and by substitution; iterated integrals and applications; series. Prereq.: Math. 25. 3 lec.; 2 rec.; 5 cr.

27. Multi-dimensional Calculus. Vectors, matrices and linear transformations, partial derivatives, maximum-minimum problems, implicit function theorem and applications, vector differential calculus, exterior products and multiple integrals, the generalized Stokes theorem and its classical specializations. Prereq.: Math. 23 or 26. 3 lec.; 2 rec.; 5 cr.

30. Astronomy. A brief descriptive course. A study of the physical characteristics and motions of the members of the solar system and the sidereal universe. Illustrated lectures, recitations, and practice in the use of equatorial telescope. Mr. Solt. Prereq.: One year of college physical science. 3 lec.; 3 cr.

41. Probability. Discrete and continuous distributions; random variables; moments; normal and Poisson distributions; the central limit theorem; laws of large numbers. Prereq.: Math. 22, 26, or 10. 3 lec.; 3 cr.

42. Statistics. Sample statistics; goodness of fit; estimation of parameters; testing of hypotheses; comparisons of the means and of the variance of two groups; correlation, fitting of curves by the method of least squares. Prereq.: Math. 41. 3 lec.; 3 cr.

51. Methods of Applied Mathematics I. Solutions of ordinary differential equations by D-operators, Laplace Transforms, and by series; representation of functions by definite integrals (Gamma, Beta, and error functions); Bessel functions; Fourier Series. Prereq.: Math. 24. 3 lec.; 4 cr.

52. Methods of Applied Mathematics II. Vector analysis (line, surface, and volume integrals); elementary variational techniques; development of some partial differential equations of mathematical physics; solutions of partial differential equations by Laplace transforms and by Green's functions. Prereq.: Math. 51 or 58. 3 lec.; 4 cr.

53-54. Methods and Techniques of Modern Computation. Methods of numerical analysis which are believed to be particularly suitable for high speed computation, including some newly developed methods. Methods for making analytical approximations will also be emphasized. An introduction to programming techniques, assembly and compiler programs, interpretive systems and symbolic operations. In the laboratory portion of the course, the practical aspects of modern computation, such as loss of precision, round-off error, overflow and underflow, etc., will be illustrated by means of short problems on both the desk calculator and the digital computer in the UNH Computation Center. A long range project for investigation on the computer will be assigned. Prereq.: Math. 24. 2 lec.; 2 lab.; 4 cr.

55. Fundamental Concepts of Geometry. Systems of postulates of various geometries; geometric invariants; synthetic and analytic projective geometry; introduction to non-Euclidean geometry, topology, and the elementary differential geometry of curves and surfaces. Prereq.: Math. 23 or 26. 4 lec.; 4 cr.

56. Topics in Number Theory. Elementary properties of integers; the Euclidean algorithm; divisibility; diophantine equations of the first degree; congruences; residue classes and the Euler function; distribution of primes; quadratic residues; diophantine equations of the second degree; selected topics in diophantine approximation and number-theoretic functions. Prereq.: Math. 10, 26 or 23. 3 lec.; 4 cr.

61-62. Higher Algebra I, II. The integers, the rational, real and complex number systems, congruences, theory of polynomial equations, theory of groups, vector spaces and transformations, matrices and determinants, rings, integral domains, fields, ideal theory, lattices, and Boolean algebras. Prereq.: Math. 10, 26 or 23. 4 lec.; 4 cr.

67. Real Analysis I. The real number system; elements of set theory; theory of limits; continuous functions and their properties; differentiability and the mean value theorem. Prereq.: Math. 10, 23, or 26. 4 lec.; 4 cr.

68. Real Analysis II. The Riemann integral; uniform convergence; double and iterated limits; applications of double limit theorem to series, limits under the integral sign and existence theorems for differential equations. Prereq.: Math. 67. 4 lec.; 4 cr.

71-72. Foundations of the Number System. Postulates and mathematical structures. A study of various mathematical systems designed to show the nature and significance of the fundamental principles of arithmetic. Intended primarily for elementary school teachers. Prereq.: Consent of instructor. 3 lec.; 3 cr.

81. Theory of Approximation. The theorems of Weierstrass on approximation of continuous functions; the Tschebycheff approximation problem;

Tschebycheff polynomials; trigonometric polynomials of best approximation; interpolation; the formulas of Lagrange and Newton; trigonometric interpolation. Prereq.: Math. 24. 3 lec.; 4 cr.

82. Non-Linear Differential Equations. Phase plane analysis of lineal systems and non-linear conservative systems; stability theorems; limit cycles and periodic solutions; the Van der Pol equation; the method of Kryloff and Bogoliouboff. Prereq.: Math. 24. 3 lec.; 4 cr.

83. Introduction to Differential Geometry. A first course in the metric differential Geometry of curves and surfaces in Euclidean space. Prereq.: Math. 24. 3 lec.; 4 cr.

84. Introduction to Topology. Elementary point-set topology in metric and topological spaces, in particular the real line and plane. Prereq.: Math. 68. 4 lec.; 4 cr.

88. Complex Analysis. The complex number system; analyticity; elementary functions; Cauchy integral theorem and formulas; Taylor and Laurent series; singularities and residues; conformal mapping. Prereq.: Math. 24. 4 lec.; 4 cr.

91. Mathematics-Education (Math-Ed). The aims and values of secondary-school mathematics; the recommendations of the national committee on mathematics requirements, and the State Board requirements; the subject matter and the sequence in which it should be presented in both junior and senior high schools; techniques and instructional aids used in teaching secondary-school mathematics; errors, testing program, remedial teaching. Students preparing to teach mathematics in high school should register for this course — it is a prerequisite for Supervised Teaching in Mathematics. Lectures, assigned readings and discussion. Prereq.: Education 58 and Math. 10, 23 or 26. 3 lec.; 3 cr. May be counted as major credit only by students preparing to teach mathematics in the secondary schools.

96. Introduction to Theory of Differential Equations. Existence and uniqueness theorems for ordinary differential equations; theory of linear ordinary differential equations of order n; oscillation and comparison theorems for second order linear ordinary differential equations; first order partial differential equations; linear partial differential equations of the second order. Prereq.: Math. 68. 3 lec.; 4 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

MECHANICAL ENGINEERING

Edward T. Donovan, *Professor;* E. Howard Stolworthy, *Professor;* Tenho S. Kauppinen, *Associate Professor;* Russell L. Valentine, *Associate Professor;* E. Eugene Allmendinger, *Associate Professor;* William E. Clark, *Assistant Professor;* Karl S. Webster, *Assistant Professor;* William Mosberg, *Assistant Professor;* Frederick G. Hochgraf, *Assistant Professor;* Elias M. O'Connell, *Instructor;* Harvard B. Emery, *Instructor;* John A. Wilson, *Instructor;* Lyman J. Batchelder, *Instructor Emeritus;* John C. Tonkin, *Instructor Emeritus*

13-14. Engineering Drawing. Representation of engineering information by multiview drawings, pictorial views, sketches, and graphs. The fundamentals of descriptive geometry. Mr. Kauppinen, Mr. O'Connell, and Mr. Emery. 1 lab.; 1 cr.

17. Manufacturing Processes and Design. A study of the machines and processes that are used in manufacturing and an analysis of the effect of these processes on the design of manufactured parts. Mr. Clark and Mr. O'Connell. Prereq.: M.E. 14. 3 lab.; 3 cr.

22, (22). Materials I. An introduction to the structure and properties of metals, plastics, and ceramics with a special emphasis on the influence of atomic structure on physical properties. Solidification, equilibrium multiphase relations, deformation models, elastic energy as a driving force. Introductory laboratory work in X-ray metallography, optical metallography, spectroscopy, dilatometry, changes in mechanical properties due to deformation. Mr. Hochgraf. 2 rec.; 1 lab.; 3 cr.

25. Statics. Analytical and graphical methods of determining forces in rigid bodies in equilibrium; properties of areas and bodies. Mr. Kauppinen, Mr. Allmendinger, Mr. Clark, Mr. Wilson, and Mr. Webster. Prereq.: Math. 22 or 26. Phys. 18. 2 lec.; 2 cr.

26. Dynamics. Kinematics, kinetics, and introduction to vibrations of mechanical systems. Mr. Kauppinen, Mr. Allmendinger, Mr. Clark, Mr. Wilson, and Mr. Webster. Prereq.: M.E. 25. Prereq. or concurrent: Math. 24. 3 lec.; 3 cr.

32, (32). Machine Shop Practice. Advanced work in machine tools and their use, production methods, inspection, and control. Mr. Clark. Prereq.: M.E. 17. 2 lab.; 2 cr.

33, (33). Thermodynamics. The fundamental laws of thermodynamics and their relation to working substances. Prereq. or concurrent: Phys. 24. 3 lec.; 3 cr.

34, (34). Thermodynamics. A more comprehensive study of thermodynamic properties of media; fundamentals of combustion; heat transfer. Prereq.: M.E. 33. 3 lec.; 3 cr.

35, (35). Strength of Materials. Stress and strains in structural and machine elements. Prereq.: M.E. 25. 3 lec.; 3 cr.

36. Fluid Dynamics. Fundamentals and phenomena of compressible and incompressible fluid flow and its relation to thermodynamics, including fluid properties, energy transfer and momentum principles. Specifically considered are adiabatic flow with and without friction, diabatic flow, dimensional analysis and flow measurement. Prereq.: M.E. 26, 33. 3 lec.; 3 cr.

37. Mechanical Laboratory. Study and instrumentation of mechanical engineering equipment. Prereq. or concurrent: M.E. 33. 1 lab.; 1 cr.

38. Mechanical Laboratory. Investigation of the operating characteristics of mechanical equipment and heat exchangers; preparation of engineering reports. Prereq.: M.E. 37. Prereq. or concurrent: M.E. 34, 36. 2 lab.; 2 cr.

40. Heating and Air Conditioning. Present methods of heating and air conditioning buildings. Mr. Stolworthy and Mr. Donovan. Prereq.: Hotel Ad. 26. 2 rec.; 1 lab.; 3 cr.

41-42. Mechanical Engineering Seminar. Student reports and discussions of recent developments in mechanical engineering. Prereq.: Senior standing. 1 lec.; 1 cr.

43-44. Machine Design and Analysis. Analysis and design of mechanical elements and systems, utilizing and developing further the fundamentals of strength of materials and dynamics. Prereq.: M.E. 26, 35, Math. 24. 3 lec.; 3 cr.

49. Thesis. An investigation or research of some mechanical engineering problem. Elective for seniors in Mechanical Engineering. Prereq.: Permission of the Department. 2 cr.

53. Power Plants. A study of the steam generating plant dealing with its equipment and costs. Mr. Donovan and Mr. Stolworthy. Prereq.: M.E. 34. 3 lec.; 3 cr.

54. Power Plants. Heat transmission theory. Heat transmission problems on power plant equipment and mechanical equipment. Mr. Donovan and Mr. Stolworthy. Prereq.: M.E. 34. 3 lec.; 3 cr.

55. Internal Combustion Engines. Thermodynamics applied to spark ignition and compression ignition engines. Fuels, carburetion, fuel injection, lubrication, performance. Mr. Stolworthy. Prereq.: M.E. 33. 2 lec.; 1 lab.; 3 cr.

56. Internal Combustion Engines. Thermodynamics applied to gas turbines and propulsion motors. Fuels, combustion, and performance. Mr. Stolworthy. Prereq.: M.E. 34 and 36. 2 lec.; 1 lab.; 3 cr.

57-58. Heat and Power Systems. Analysis and solution of heat and power system problems, utilizing and developing further the fundamentals of thermodynamics, fluid flow, combustion, and heat transfer. Prereq.: M.E. 34, 36, and 38. 3 lec.; 1 lab.; 4 cr.

63. Materials II. Behavior of metals, plastics, and ceramics in engineering environments. Non-equilibrium multiphase relations, diffusion, nucleation of phases, dislocation models of creep and relaxation, ductile and brittle modes of failure, thermal stresses, modification of bulk and surface properties through deformation and heat treating. Laboratory work includes observation of properties by classical mechanical methods. Mr. Hochgraf. Prereq.: M.E. 22. 2 lec.; 1 lab.; 3 cr.

65. Engineering Economy. The principles which form the basis of engineering procedures for obtaining the highest ratio of utility to cost. Mr. Donovan. Prereq.: Senior standing. 3 lec.; 3 cr.

66. Industrial Management. Principles and methods of industrial management, designed to give students a working knowledge of modern industrial practice, with particular emphasis on the engineering viewpoint. Prereq.: Senior standing. Mr. Donovan. 3 lec.; 3 cr.

67. X-Ray Metallography. Theoretical and experimental studies of X-ray diffraction and micro-radiography. Production of x-rays; directions and intensities of diffracted beams; Laue and Debye-Scherrer photographs; size, perfection, and orientation of grains; phase diagram determinations; stress measurement. Mr. Hochgraf. Prereq.: M.E. 22 or permission of instructor. 2 rec.; 1 lab.; 3 cr.

71. Naval Architecture I. Introduction to ships — nomenclature and types. Geometry and hull form delineation. Hydrostatic characteristics of freely floating, partially waterborne, and damaged ships. Hydrostatic characteristics of submerged bodies. Introduction to ship strength. Computer application to problems. Prereq.: M.E. 25, M.E. 35 (may be taken concurrent). 3 rec.; 3 cr.

72. Naval Architecture II. Hydrodynamic resistances — surface ships and submerged bodies. Model testing theory. Powering and propellers. Use of "Standard Series" tests. Introduction to ship motion and control steering and rudders. Concepts of ship design. Computer application to problems. Prereq.: M.E. 26, M.E. 71, Math. 24. 3 rec.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

MICROBIOLOGY

LAWRENCE W. SLANETZ, *Professor*; THEODORE G. METCALF, *Professor*; WILLIAM CHESBRO, *Assistant Professor*

1. GENERAL MICROBIOLOGY. Principles of microbiology; morphology, physiology, and classification of bacteria and other microorganisms, and their relationship to agriculture, industry, sanitation, and infectious diseases. Mr. Slanetz, Mr. Metcalf, and Mr. Chesbro. Prereq.: Chem. 1-2 or equivalent. 2 lec.; 2 lab.; 4 cr.

2. FOOD AND SANITARY MICROBIOLOGY. Relation of microorganisms to food production; food preservation; food infections and intoxications; standard laboratory methods for the bacteriological examination of foods. Microbiology and sanitation of milk, water, sewage, air, and eating utensils. Disinfection and disinfectants. Mr. Slanetz and Mr. Chesbro. Prereq.: Microb. 1. 2 lec.; 2 lab.; 4 cr.

5. PUBLIC HEALTH AND SANITATION. The nature and types of microbes causing infectious diseases; the prevalence, transmission, and control of these diseases. Sanitation of water, sewage, food, and air. Community hygiene and public health administration. Mr. Slanetz. Prereq.: Biol. 1-2, or consent of instructor. 3 lec. or demonstrations; 3 cr.

6. SOIL MICROBIOLOGY. The nature and types of bacteria and other microorganisms present in soil and their activities in carrying out decomposition of plant and animal matter; their role in the nitrogen, carbon, and sulfur cycle in soil; their relationship to other soil inhabitants; and their contribution to soil fertility. Mr. Chesbro. Prereq.: Microb. 1. 2 lec.; 2 lab.; 4 cr. (Alternate years; not offered 1962-63.)

8. PATHOGENIC MICROBIOLOGY. The morphological, cultural, biochemical, serological, and pathogenic characteristics of microorganisms causing human and animal diseases. Mr. Metcalf. Prereq.: Microb. 1. 2 lec.; 2 lab.; 4 cr.

53. IMMUNOLOGY AND SEROLOGY. The theories of infection and immunity; production of vaccines, toxins, and antiserums; serological techniques for disease diagnosis and identification of bacteria, including agglutination, precipitin, and complement fixation tests. Mr. Metcalf. Prereq.: Microb. 8. 2 lec.; 2 lab.; 4 cr.

54. INDUSTRIAL MICROBIOLOGY. Microorganisms important in industrial processes. Isolation and study of the bacteria, yeasts, molds, and actinomycetes used for the manufacture of industrial products. Discussion of the theoretical aspects of fermentation and respiration and their practical applications. Typical industrial processes employing microorganisms. Mr. Chesbro. Prereq.: Microb. 1 and organic chemistry. 2 lec.; 2 lab.; 4 cr. (Alternate years; offered 1962-63.)

55, 56. PROBLEMS IN MICROBIOLOGY. Special problems, depending upon the training and desire of the student. Elective only upon consultation. Mr. Slanetz and staff. Credits to be arranged.

57, 58. MICROBIOLOGY SEMINAR. Reports and discussions on current literature and recent developments in microbiology. Mr. Slanetz and staff Prereq.: Microb. 2 or 8 and consent of the instructor. 1 2-hr. period; 1 cr.

60. VIROLOGY. The animal and plant viruses including bacteriophages and the rickettsiae. A consideration of techniques, pathogenesis, immunity, and host-virus relationships. Mr. Metcalf. Prereq.: Microb. 8. 1 lec.; 3 lab.; 4 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

KARL H. BRATTON, *Professor;* ROBERT W. MANTON, *Professor;* DONALD E. STEELE, *Professor;* JOHN B. WHITLOCK, *Associate Professor;* ANDREW J. GALOS, *Associate Professor;* IRVING D. BARTLEY, *Assistant Professor;* JOHN W. WICKS, *Assistant Professor;* RAYMOND A. HOFFMAN, *Assistant Professor;* DONALD A. MATTRAN, *Assistant Professor;* JOHN J. ZEI, *Instructor*

Music Organization

Registration for musical organization courses should be completed during the registration period. These courses cannot be used to satisfy major requirements except in the Music-Education Curriculum. *Each participant must be registered for either credit or audit. By permission of instructor.*

1, (1). UNIVERSITY BAND. Open to all students on the basis of individual audition. The Marching Band presents precision performances at home and away football games, pep rallies, and parades. The Symphonic Band studies and performs the finest in band literature and gives concerts on campus and throughout the New England area. Mr. Mattran. Prereq.: Permission of instructor. 2 lab.; ½ cr.

2, (2). UNIVERSITY-COMMUNITY SYMPHONY ORCHESTRA. Open to all students and others on basis of individual tryouts. The orchestra gives several concerts during the year and also accompanies the vocal groups and solo instrumentalists on various occasions. Membership includes students, faculty, and members of the surrounding communities. Mr. Galos. Prereq.: Permission of instructor. 2 lab.; ½ cr.

3, (3). WOMEN'S GLEE CLUB. Open to all students interested in singing who fulfill the requirements of a tryout. Recommended for all women voice majors. Mr. Zei. Prereq.: Permission of the instructor. 2 lab.; ½ cr.

4, (4). MEN'S GLEE CLUB. Open to all students interested in singing who fulfill the requirements of a tryout. Recommended for all men voice majors. Mr. Zei. Prereq.: Permission of the instructor. 2 lab.; ½ cr.

5, (5). UNIVERSITY CONCERT CHOIR. An advanced choral group devoted to study and performance of the best classical and modern choral literature. Recommended for men and women voice majors. Mr. Bratton. Prereq.: Permission of instructor. 2 lab.; ½ cr.

6, (6). R.O.T.C. BAND. Open only to freshmen and sophomore men enrolled in the R.O.T.C. program on basis of individual tryouts. This band furnishes music for all military functions, and other University activities when needed. Mr. Mattran. Prereq.: Permission of instructor. 2 lab.; ½ cr.

7, (7). ENSEMBLE. v) Vocal; s) String; ts) Tudor Singers; b) Brass; ww) Woodwind. Small groups of instrumentalists and vocalists organized to provide advanced students experience in such groups. Prereq.: Permission of the instructor. 2 lab.; ½ cr.

8, (8). STRING ORCHESTRA. Open to all students on basis of individual tryouts. This group appears at all the University Symphony Orchestra concerts. 1 rec.; ½ cr. (Not offered 1962-63.)

A maximum of 8 credits earned in music organizations may be used toward graduation.

Applied Music

Register for the following courses as Mus. 23, etc.

Lessons in Applied Music are based on ½-hour private instruction per week. One semester hour of credit may be earned with one lesson per week; two semester hours of credit may be earned with two lessons per week. Five one-hour practice periods per credit will be sought out by the music students themselves. The special semester fee for Applied Music is $25 for one lesson a week, and $50 for two lessons a week. These fees include the use of a practice room for the required preparations.

Majors in Applied Music are required to present 16 semester hours in Applied Music taken over a period of four years. Two lessons per week are required each semester. Four semester credits taken in the freshman year are regarded as prerequisite to the Applied Music option.

Registration in Applied Music courses is open to all students in the University, subject to approval by the instructor. A student may register for credit in the same course in successive semesters.

19, 20. Voice Class for Beginners. To develop the basic fundamentals in voice culture, such as breathing, phrasing, diction, pure tone, resonance, posture, and study of vocal solo literature through group activity with some of the finest works of the masters. Permission of the instructor. Mr. Zei. 2 rec.; 2 cr.

21, 22. Functional Piano Class. Piano instruction primarily for beginning students in a class. Training in the following subjects will constitute the course; pianoforte techniques and reading of music; keyboard harmony geared to the practical harmonization of grade school melodies; transposition; sight reading; improvisation. Especially for students interested in the Music Education Curriculum. Mr. Steele. Enrollment limited to 8. Permission of instructor. 2 rec.; 2 cr.

†23, (23). Piano. The methods of presentation and the material used vary with each pupil and his degree of advancement. With beginners, training is given in the fundamentals of pianoforte technique and in the reading of keyboard music. As early as is practicable, emphasis is placed on musical values, musicianship, and sound piano technique. For this purpose, the literature employed is selected from the masters. Musical understanding is developed and quality of performance is stressed. With the attainment of advanced technique, the student's repertory is broadened to include works of all periods of literature: pre-Bach, J. S. Bach, C. P. E. Bach, Scarlatti, Haydn, Mozart, Beethoven, the romantic composers, the post-romantic, and present-day composers. Mr. Manton, Mr. Steele, Mr. Bartley, Mr. Wicks, and Mr. Galos. 1 or 2 lessons; 1 or 2 cr.

†24, (24). Organ. A thorough foundation in pedal and manual technique, including hymn playing, followed in subsequent semesters by the standard works of Bach, Cesar Franck, Widor, and contemporary composers. Students should be proficient in piano before enrolling for organ. Permission of the instructor is required. Mr. Bartley and Mr. Wicks. 1 or 2 lessons; 1 or 2 cr.

†25, (25). Violin, Viola. The choice of literature and method in violin teaching depends entirely on the individual pupil's background and ability, therefore no single course of study is set up as a requirement for all pupils. Emphasis is placed primarily on musicianship and musical values, and the development of a sound, reliable technique is a means to that end. Tech-

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nique is developed in these lessons not so much through exercise and drill as it is through the best in literature. Mr. Galos. 1 or 2 lessons; 1 or 2 cr.

†26, (26). Voice. Instruction in voice will seek to develop those qualities which are essential for intelligent interrelations, such as correct posture, breathing, pure tone, resonance, clear enuniciation, and technical facility. Each voice is given the treatment best suited to its individual needs. A higher ideal than the perfection of mere mechanical skill is sought, namely a musicianly style of singing and a thorough appreciation of the best works of the masters, both classic and modern. Mr. Bratton and Mr. Zei. 1 or 2 lessons; 1 or 2 cr.

27, (27). Violoncello, String Bass. Objectives are based primarily on the student's ability and experience. A general awareness of the instrument as regards technique and tone are the first essential prerequisites. These elements will gradually broaden to include the attention and cultivation of the student's musical perception and repertoire. Mr. Hoffman. 1 or 2 lessons; 1 or 2 cr.

†28, (28). Woodwind. The technique and literature of clarinet, flute, oboe, bassoon, and saxophone, or any woodwind instrument. Mr. Mattran and Mr. Whitlock. 1 or 2 lessons; 1 to 2 cr.

†29, (29). Brass. Instruction in any of the following instruments: trumpet, trombone, French horn, baritone, and tuba, or any brass instrument. Correct tone production, articulation, and musical interpretation are stressed. Mr. Whitlock and Mr. Mattran. 1 or 2 lessons; 1 or 2 cr.

†30, (30). Percussion. Snare drum rudiments. The technique, tuning and sticking of the pedal and hand timpani. Cymbals and all other percussion effects (claves, maracas, triangle, tambourine, wood-block, chimes, etc.) Glockenspiel, bells, or bell lyre, as well as xylophone. Mr. Whitlock. 1 or 2 lessons; 1 or 2 cr.

117, 118. Applied Music for Graduate Credit. a) Piano; b) Organ; c) Stringed Instruments; d) Voice; e) Woodwind; f) Brass; g) Percussion. Further development of technique, music interpretation, performance, and emphasis oriented toward the functional use of the instrument in the schoolroom. Prereq.: Must exhibit sufficient proficiency to warrant graduate study. Permission of the Chairman of the Department and the student's graduate supervisor. Audition required. A student may register for credit in the same courses in successive years with the approval of his major professor. Mr. Bratton and staff. 1-2 cr.

Theory and Composition

*†9-10. Sightsinging, Ear Training, Dictation I. Intensive training in the acquisition of the basic essentials of music. Development of rhythmical sense, the identification and singing of intervals, accurate response to melodic, harmonic, and rhythmical dictation, the basic laws of musical notation, knowledge of scales, and terminology. Mr. Hoffman. 3 labs.; 0 cr.

†11-12. Harmony I. Basic techniques in harmonization in four parts of basses (figured and unfigured) and soprano melodies using triads and their inversions, nonharmonic tones, the dominant seventh and its inversions, and secondary dominants. Attention will also be given to harmonic rhythm

* Mus. 9-10 is normally prerequisite to Mus. 11-12, but the two may be taken simultaneously with the approval of the instructor in Mus. 11-12. Qualified students are exempted from Mus. 9-10 when proper notification is furnished the College Dean's Office and the University Registrar.

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and modulation. Harmonic analysis of Bach chorales will be an integral part of this course. Keyboard harmony will also be stressed. Mr. Wicks. Prereq.: Music 9-10. However, if the student has sufficient familiarity with the keyboard to be able to read simple pianoforte music, he should take Music 11-12 in his freshman year along with Music 9-10. In this case, permission of the instructor is required. 3 rec.; 2 cr.

†13-14. Sightsinging, Ear Training, Dictation II. An extension of Music 9-10. Further training in basic elements of music. The rhythmical and melodic phenomena of the art, development of acuity and accuracy in perception and response. Mr. Hoffman. Prereq.: Mus. 9-10. 3 lab.; 1 cr.

15-16. Harmony II. Continuation of harmonization techniques developed in Harmony I. The use of irregular resolutions; the diminished 7th; the incomplete major 9th; the complete dominant 9th; the sequence; the non-dominant 7th, 9th, 11th, and 13th; the raised supertonic and submediant; the Neapolitan sixth; the four augmented 6th chords; and other chromatically altered chords. Formal and harmonic analysis of preludes in the Well-Tempered Clavier and works of the Classical and Romantic periods. Continued emphasis on keyboard harmony. Mr. Wicks. Prereq.: Mus. 11-12. 3 rec.; 2 cr.

†41-42. Conducting Methods — Instrumental and Choral. The development of conducting — physical aspects, equipment of conductor, fundamental gestures and beats, baton techniques. The reading and analysis of full and condensed scores. Essential choral and instrumental conducting techniques, problems of choral organization, psychology of rehearsal. Mr. Galos. 2 rec.; 1 cr.

†53-54. Counterponit. First semester: Sixteenth century polyphony based on the sacred choral style of Palestrina, Vittoria, Lassus, and others of this period. Second semester: free instrumental counterpoint based on the styles of Bach, Handel, and other classic masters. Twentieth century counterpoint will be discussed in the closing classes of the course. Mr. Manton. Prereq.: Mus. 15-16 or permission of instructor. 2 rec.; 2 cr.

†59-60. Canon and Fugue. Free counterpoint in three and four parts, double counterpoint, the writing of simple two-part inventions, choral preludes, etc. The canonic and fugal studies will be based largely upon the works of Bach and will have as their objective the composition of a two-, a three-, and a four-voiced fugue. Mr. Manton. Prereq.: Mus. 53-54 or permission of instructor. 2 rec.; 2 cr.

†71-72. Composition. The various smaller harmonic forms, the variation, the rondo, and the sonata forms will serve as models for composition. Mr. Manton. Prereq.: Permission of the instructor. 2 rec.; 2 cr.

†97-98. Orchestration. Instruments and methods of combining them into coherent arrangements arriving at successful balances for the band and orchestral arranger. The characteristics, range, and tone quality of the instruments are fully covered and transcriptions are made. Orchestral effects are studied. Chorestration is offered during the latter part of the second semester. The techniques of writing for solo voices, for mixed voices, men's and women's voices, are taken up through the medium of arrangements, and original work. Mr. Manton. Prereq.: Permission of the instructor. 2 rec.; 2 cr.

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35. Music Appreciation. Intelligent listening through formal analysis of the irreducible minimum of great musical masterpieces. A selection of the most important works of Beethoven, Shubert, Mendelssohn, Chopin, Liszt, Brahms, Franck, Tschaikowsky, d'Indy, and many others analyzed by the students and the instructor and played several times in the classroom. 2 cr. (Special Summer Session course.) (Not offered in 1962.)

36. Music Appreciation. Continuation of Music 35. Masterpieces drawn from the works of Palestrina, Bach, Handel, Haydn, and Mozart. Selections will be analyzed by the students and the instructor and played several times in the classroom. Supplementary assigned recordings at the University Library. 2 cr. (Special Summer Session course.) (Not offered in 1962.)

37-38. Introduction to Music Literature. A beginning listener's approach to the great music of the ages. Emphasis will be placed not only on the means of acquiring a discerning ear, but also on presenting a broad perspective of music in relation to the history of Western civilization. Mr. Wicks and Mr. Hoffman. 3 lec.; 3 cr.

40. Summer Session Chorus and Basic Conducting. A choral group devoted to the study and performance of the best classical and modern choral literature. The basic elements of choral conducting, for elementary and secondary teachers, church choir directors, and those interested in singing. May be taken for credit or as recreation. Mr. Bratton. 1 cr. (Special Summer Session course.) (Offered in 1962.)

†43. Survey of Music in America. The development of music in the United States from Colonial times to the present. The various influences, such as the English tradition, the German era, the French impressionistic influence, and finally the quest for an American style with the music of the most representative composers. Mr. Manton. 2 lec.; 2 cr. (Alternate years; not offered 1962-63.)

†47, 48. Survey of Pianoforte Literature. The history and development of keyboard literature from Bach to the present. A discussion and performance of the works of Bach, the sonatas and concertos of Haydn, Mozart, Beethoven, Shubert, the Romantic composers, and of contemporary writers. Mr. Steele. 2 lec.; 2 cr. (Alternate years; offered 1962-63.)

†61. Masters of the Renaissance. Important composers of the fifteenth and sixteenth centuries and their works: Vittoria, Palestrina, Byrd, and others. Mr. Wicks. 2 lec.; 2 cr. (Alternate years; offered 1962-63.)

†62. Music of the Eighteenth Century. The lives and outstanding works of Bach, Handel, Haydn, and Mozart. Mr. Wicks. 2 lec.; 2 cr. (Alternate years; offered 1962-63.)

†63. Romantic Music of the Nineteenth Century. The sonata form as a basis for the symphonies, concerti, chamber music, and keyboard works of Beethoven, Berlioz, Schubert, Mendelssohn, Schumann, Brahms, Franck, Chopin, and Liszt. Romantic elements contained in the development of harmony orchestration, sonority, expressive content. The rise of the short piano piece, the German art song, the symphonic poem, nationalism in music. Mr. Steele. 2 rec.; 2 cr. (Alternate years; not offered 1962-63.)

†64. Twentieth Century Music. Music of the twentieth century, including its literature, its trends, and an analysis of techniques, styles, forms, and expression. Mr. Steele. 2 rec.; 2 cr. (Alternate years; not offered 1962-63.)

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†(83). The Life and Works of Beethoven. The piano sonatas, symphonic works, and the string quartets. Lectures, analysis, reports, required readings, and listening. Mr. Manton. 2 rec.; 2 cr. (Alternate years; not offered 1962-63.)

†87, 88. Survey of Opera and Oratorio. The oratorio and the opera beginning in Italy in the sixteenth century, culminating in modern opera and oratorio. This includes comic, grand, and romantic opera, and composers such as Handel, Mozart, Verdi, Puccini, Wagner, and Richard Strauss. The development of the recitative and aria styles and trends. Oratorio is stressed in the first semester; opera in the second. Mr. Zei. 2 rec.; 2 cr. (Alternate years; offered 1962-63.)

Music Education

The Department of Music offers a four-year curriculum for teachers of elementary and secondary school music. (See Music-Education curriculum.)

Register for the following courses as Mu-Ed. 90, etc.

55. Choral Methods and Repertoire for the Elementary and High School Teacher. A lecture-workshop course touching upon some of the problems and solutions in the organization and performance of elementary and high school glee clubs and community choirs. Emphasis is placed on techniques of rehearsal, repertory and suitable materials. Mr. Bratton. Prereq.: Permission of the instructor. 2 cr. (Special Summer Session course; offered 1962.)

57. Essentials of Music for the Classroom Teacher. A course designed to provide training in the elements and appreciation of music for application to the grade-school classroom situation. Emphasis will be placed on melodic and rhythmical accuracy, basic keyboard harmony, elementary conducting, music literature. Recommended for the grade-school teacher. No performing ability required. Mr. Steele. Prereq.: Permission of the instructor. 2 cr. (Special Summer Session course; not offered in 1962.)

90. Problems in the Teaching of Elementary School Music. Aims, scope, and organization of materials and activities in the elementary schools in keeping with modern trends in educational philosophy. The child voice, its care and development. A demonstration of materials and methods for the various grades. Observations of elementary school music. Mr. Whitlcok. Prereq.: Educ. 58. 3 lec.; 1 lab.; 3 cr.

†93. Problems in the Teaching of Secondary School Music. The application of educational principles to the teaching and learning of music, and the organization of the music curriculum on the junior and senior high-school levels. The adolescent voice and the classification of voices; the selection of vocal and instrumental materials to fit the needs of the individual group, in order to insure the maximum growth and musical development of the students; and the building of unified concert programs. Problems of administration and management, and the relationship of the teacher to school and community. Observation of music programs in secondary schools. Mr. Whitlock. Prereq.: Educ. 58. 3 lec.; 1 lab.; 3 cr.

†94. Organization and Administration of School Music Groups. Problems of organizing and administering school orchestras, bands, glee clubs, choruses and small ensembles, such as objectives, motivation, schedule,

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discipline, equipment, programs, finances, rehearsal techniques, contests and festivals, materials, personnel selection and grades. Mr. Whitlock. 3 cr. (Special Summer Session course; not offered in 1962-63.)

†95. Techniques and Methods in Stringed Instruments. Class-teaching of stringed instruments simulating classroom situations and methods. Mr. Galos. 2 lec.; 2 cr.

†(96). Techniques and Methods in Woodwind Instruments. Correct tone production and technique of woodwind instruments. Materials and procedures for class and individual instruction. The school band as a concert organization. Mr. Mattran. 2 lec.; 2 cr. *(This is a first semester course.)*

†97. Techniques and Methods in Brass and Percussion Instruments. Correct tone production and technique of brass instruments and of rudimentary percussion technique. Materials and procedures for class instruction. Mr. Whitlock. 2 lec.; 2 cr.

†98. Music for the Elementary Classroom Teacher. For the non-music specialist interested in utilizing music as a means of enriching children's lives. The correlation and integration of music in the school curriculum and the basic skills and techniques necessary. Also open to music specialists and school administrators. Mr. Whitlock. 3 cr. (Summer Session course.)

Education-Music (Ed-Mu) 93, 94. Supervised teaching in elementary and secondary school music. Prereq.: Mu-Ed 90, 93.

99. Music Education Seminar — Instrumental and Choral. A study and discussion of instrumental and choral music methods in the elementary and secondary schools with emphasis given to voice and instrumental classes, as well as the development of music organizations. This seminar is especially designed for classroom music teachers and supervisors of considerable experience. Opportunity will be given the class members to observe the University of New Hampshire Summer Youth Music School organizations during the sixth week. Prereq.: Teaching experience in instrumental and/or choral music. Mr. Bratton and Mr. Whitlock. 3 cr. (Special Summer Session Course; offered 1962.)

OCCUPATIONAL THERAPY

(See The Arts)

PHILOSOPHY

Robert W. Jordan, *Associate Professor;* Donald C. Babcock, *Professor Emeritus;* Asher Moore, *Professor;* Jan Narveson, *Instructor*

3. Logic. An introduction to the principles of good reasoning, including practice in their application. The correct use of language, the logical structure of arguments, the detection of fallacies in reasoning, and the nature of scientific method. Mr. Narveson. Open to all students. 3 lec.; 3 cr.

(5). Introduction to Philosophy. An examination of representative philosophies and of some of the persistent problems of philosophy. An introductory course designed to acquaint the student with the nature of philosophy and to help him think about his experience philosophically. Mr. Moore. Open to all students. 3 lec.; 3 cr.

(8). Philosophy of Human Nature. A study of representative views of the nature of man, such as the alternatives proposed by theism, naturalism, and existentialism, and with particular attention to some of the fun-

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damental problems of ethics, such as duty and happiness, freedom and responsibility, individualism and authority. Readings from traditional and contemporary philosophical literature and from the literature of the social sciences. Mr. Jordan. Open to all students. 3 lec.; 3 cr.

21, 22. History of Philosophy. The history of Western philosophy through the study of the major figures and movements from the early Greek philosophers to the nineteenth century. Mr. Jordan. 3 lec.; 3 cr. Philosophy 21, 22 replaces Philosophy 1, 2 and may not be taken for credit by students who have passed Philosophy 1, 2.

Students who are interested in advanced work in philosophy should take Philosophy 21, 22 as early as possible. This course is not ordinarily open to freshmen, but freshmen who expect to major in philosophy or who intend to take advanced work in philosophy may elect the course by securing the permission of the instructor. Students who wish to register for Philosophy 22 without having taken Philosophy 21 must secure the permission of the instructor.

24. Mediaeval Philosophy. The philosophic thought of the Middle Ages from Augustine to Scotus but with particular emphasis upon the writings of St. Augustine and St. Thomas Aquinas. Mr. Jordan. Prereq.: Philosophy 21 or permission of the instructor. (Not open to freshmen.) 3 lec.; 3 cr. (Alternate years; not offered 1962-63.) Philosophy 24 replaces Philosophy 64 and may not be taken for credit by students who have passed Philosophy 64.

(25). Philosophy of Religion. A study of the philosophical approach to the nature and significance of religious experience, the relation between faith and reason, and the fundamental problems of philosophical theology. Mr. Jordan. (Not open to freshmen.) 3 lec.; 3 cr. Philosophy 25 replaces Philosophy 54 and may not be taken for credit by students who have passed Philosophy 54.

(26). Aesthetics. An examination of representative theories concerning the nature of art and aesthetic experience. Mr. Jordan. (Not open to freshmen.) 3 lec.; 3 cr. Philosophy 26 replaces Philosophy 65 and may not be taken for credit by students who have passed Philosophy 65.

27. Ethical Theories. A study of the problems of moral philosophy through the critical examination of important traditional and contemporary theories of ethics. Mr. Narveson. (Not open to freshman.) 3 lec.; 3 cr.

28. Social and Political Philosophy. An introduction to political philosophy and ideology concentrating on the specifically philosophical problems involved in social conduct and in the formulation of public policy, especially problems of an ethical nature. A main feature of this course will be an intensive discussion of the philosophical foundations of democrecy. Mr. Narveson. (Not open to freshmen.) 3 lec.; 3 cr.

52. Philosophy through Literature. A study of the philosophical implications of representative literary works with particular emphasis on recent and contemporary literature. Mr. Jordan. 3 lec.; 3 cr. (Alternate years; offered in 1962-63.)

55. Analytic Philosophy. A study of analytic philosophy, its roots in the nineteenth century, its relation to science, and its development to the present day. The application of the analytic method to the solution of philosophic problems. Readings from such recent and contemporary figures as Russell, Wittgenstein, Ayer, Carnap, Ryle, and Narveson. Prereq.: Philosophy 21, 22. 3 lec.; 3 cr. (Alternate years; offered in 1962-63.)

56. Existentialism. A study of existentialism, its roots in the nineteenth century, its relation of phenomenology, and its development to the present

day. Readings from such recent and contemporary figures as Sartre, Marcel, Heidegger, and Jaspers. Mr. Moore. Prereq.: Phil. 21, 22. 3 lec.; 3 cr. (Alternate years; not offered in 1962-63.)

58. Philosophy of Science. A discussion of various philosophical problems raised by science. For example: induction and probability, the nature of law, the significance of statistical techniques, the purpose and general principles of experimental design, theory construction, operationism, the nature of mathematics and its application in science, the place of speculation in science, the unity of science, special problems of the biological and social sciences. The relation of science to ethics, the humanities, and everyday life. Mr. Narveson. 3 lec.; 3 cr. (Alternate years; offered in 1962-63.)

89. Studies in the History of Philosophy. Intensive study of individual philosophers, important movements, schools, or periods in the history of philosophy. Subjects and instructors to be announced each year. Prereq.: Philosophy 21, 22. Lectures, lectures-discussion, or seminar. 3 cr. Barring duplication of subject this course may be repeated for credit. *Subject for 1962-63: Nineteenth Century Philosophers.* Mr. Moore.

90. Topics in Systematic Philosophy. Intensive study of selected problems of philosophy in such areas as epistemology, metaphysics, and theory of value. Topics and instructors to be announced each year. Prereq.: Phil. 21, 22. Lectures, lectures-discussion, or seminar. 3 cr. Barring duplication of subject this course may be repeated for credit. *Topic for 1962-63: Moral Principles.* Mr. Narveson.

99. (99). Individual Study. Students who are adequately prepared to do independent work involving extensive reading and writing may do advanced work on an individual basis. Before registering for this course the student must formulate a project and secure the consent of a member of the department who will supervise his work. Conferences and/or written work as required by the supervisor. Credits to be arranged.

PHYSICAL EDUCATION FOR MEN

Carl Lundholm, *Director and Professor of Physical Education and Athletics;* Paul C. Sweet, *Professor;* Clarence E. Boston, *Associate Professor;* E. William Olson, *Associate Professor;* A. Barr Snively, Jr., *Assistant Professor;* Edward J. Blood, *Assistant Professor;* Andrew Mooradian, *Assistant Professor*

Requirements. Physical Education is required of all freshman men students and first-year students in the Thompson School of Agriculture. Each student must provide himself with an activity suit consisting of gray sleeveless jersey, gray trunks, white woolen socks and rubber-soled tennis or basketball shoes. This suit must be worn at all classes in physical education.

31, 32. Physical Education. Development of the organic system generally; stimulation of the neuromuscular system through physical activity; encouragement of a proper attitude toward play; development of an appreciation of physical activities as worthwhile leisure-time recreation. *Required of freshmen.* 2 periods; ½ cr. Students passing will get grade of cr.

Required of students registered in the Physical Education Teacher Preparation Curriculum for Men. Elective for other students who are preparing to teach an academic subject as indicated by taking Ed. 41 and planning to take Ed. 57-58.

23. Principles of Physical Education. The aims, objectives, and principles of physical education and the historical factors which have influenced the physical life of nations. Mr. Lundholm and Miss Browne. 3 lec.; 3 cr.

45. Football. A history of football with consideration of its educational implications and an analysis of the various systems of play. Instruction in team and individual offensive and defensive fundamentals. The rules, theory, strategy, generalship of team play, and the responsibilities of the coach for the physical welfare of the team. Mr. Boston. 1 lec.; 2 lab.; 2 cr.

46. Baseball. Theoretical and practical consideration of the basic principles of batting and fielding; the fundamentals of each position; special stress on problems involving team play, coaching methods, physical conditioning, and rules; a history of the game with a consideration of its educational values. 1 lec.; 2 lab.; 2 cr.

47. Track and Field Athletics. Instruction and practical demonstrations in starting, sprinting, middle distance and distance running, relay, racing, hurdling, high and broad jumping, pole vault, shot putting, discus, hammer and javelin throwing. Methods of preparing contestants for the various events. Mr. Sweet. 1 lec.; 2 lab.; 2 cr.

48. Basketball. History of basketball with a consideration of its educational values. Theory and practice in the fundamentals of individual offense and defense. The various styles of team offense and defense and rules of the game. Problems in handling and conditioning a team. Mr. Olson. 1 lec.; 2 lab.; 2 cr.

61. Problems of Teaching in Physical Education. Methods and materials of instruction, theories of play, and actual practice for the successful teaching of recreational activities in school, in the playground, and in the community. Studies of activities adapted to different levels of maturity. Mr. Lundholm. 3 lec.; 3 cr.

63. Care and Prevention of Injuries. Nature and causes of injuries incident to physical activities, the common hazards of play, and preventive measures for children and athletes are discussed. First aid principles are presented. Elective for seniors who have taken one of the following: P.E. 45, 46, 47, 48. Mr. Blood. 2 lec.; 2 cr.

65. Administration of Physical Education in Secondary Schools. The aims and objectives of health and physical education. Organization and supervision of a complete unified program of health and physical education including the legal aspects, intra-mural and inter-scholastic athletics, medical problems, budgeting, financing, maintenance of equipment, publicity programs, and office management. Each student will be given an opportunity to serve on a committee to draw up an original program of health and physical education in a theoretical or actual situation found in some secondary school. Prereq.: Zool. 17-18; P.E. 23 and 61; and two courses in the coaching of sports. These last may be taken concurrently. Mr. Olson. 3 lec.; 3 cr.

93, (93). Education-Physical Education (Ed-PE). Directed Teaching in Physical Education. Given in the Department of Physical Education and Athletics for Men. Prereq.: Zool. 17-18; P.E. 23 and 61. The student must have completed the methods course in the sport which he is directing or take the course concurrently. Mr. Mooradian. 6 lab.; 3 cr.

PHYSICAL EDUCATION FOR WOMEN

MARION C. BECKWITH, *Director and Professor of Physical Education for Women;* EVELYN BROWNE, *Associate Professor;* CAROLINE S. WOOSTER, *Associate Professor;* BARBARA K. NEWMAN, *Associate Professor;* JOAN T. STONE, *Assistant Professor;* JACQUELINE A. CLIFFORD, *Assistant Professor;* B. JOYCE MILLS, *Assistant Professor;* NANCY L. BAIER, *Instructor;* JUDITH I. JACOBS, *Instructor;* HARRIET F. BELFORD, *Instructor**

The Department of Physical Education for Women aims to develop in each individual the physical, social, and mental qualities which will enable her to meet successfully the demands of modern society. The course includes recreational and leisure-time activities, vigorous team sports and gymnatics, rhythmic and dance activity, and the opportunity to participate in club activities which are provided primarily for the more highly skilled. This program is supplemented by the extra-curricular competition sponsored jointly by the Women's Recreation Association and the Department.

REQUIREMENTS. All women students are required to complete at least one credit of physical activity for each of the first four semesters they attend the University. Freshmen women should register for P.E. 1, 2; sophomores for P.E. 3, 4. A second activity may be elected each semester for additional credit (P.E. 11, 12, 13, 14, etc). Unless there is an elementary *and* an intermediate section, the same activity shall not be credited more than twice.

PHYSICAL EXAMINATION. Each student must, before entering, have had a physical examination by a physician. A posture test will be given by the Physical Education staff. Individual gymnastics is required of each freshmen whose physical condition indicates this need. Students with physical disabilities must follow the same procedure as other students including registration for physical education. In most cases, modified activities are recommended by the University Physician.

MOTOR ABILITY TESTS. All students are expected to take the Humiston Motor Ability Test the fall that they enter the University.

ADVANCED INSTRUCTION. To provide for the more highly skilled student and to encourage the interest and ability of the less skilled, the Department includes in its program numerous club and other activities in which advanced instruction is given by a member of the teaching staff. Membership: Open to any University student. Qualifications: Club standards or membership requirements of group.

Clubs and Instructor: Dance Club — Miss Jacobs; Rifle club — Miss Browne; Durham Reelers — Miss Jacobs; Skating Club — Miss Clifford; Ski Club — Miss Newman; W.R.A. — Miss Stone and staff. A Riding Club is also available — Mr. Kimball, Instructor, Animal Science Department.

Women students following any Teacher Training curriculum are urged to elect for required Physical Education the following activities: folk dancing, recreation workshop, volleyball, hockey, basketball, and American country dancing.

REQUIRED COSTUME, FEES AND EQUIPMENT. Special gymnasium uniforms consist of blue cotton tennis-type dress and shorts, white socks, and regulation gymnasium sneakers. Students are required to furnish their own individual equipment for such activities as tennis, skiing, and skating. Equipment is furnished for golf, fencing, badminton, hockey, archery, lacrosse, riflery, and softball. The special riding fee is $35 a quarter for two periods a week.

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* On half-time.

1, 2, 3, 4. Physical Education. Students should register for one activity (meeting three hours a week) from the lists below. Freshmen from A to L elect fundamentals first quarter; from M to Z elect fundamentals second quarter. Sophomores from A to L elect dance survey third quarter; from M to Z elect dance survey fourth quarter. 3 hrs.; 1 cr.

(1), (2), (3), (4). Physical Education. The parenthesis indicates a first semester course taken second semester and vice versa; this is for transfer students and for those who have failed. See description above. 3 hrs.; 1 cr.

Activity Courses

(elect one each quarter)

First Quarter: Apparatus, archery (elem. + inter.), badminton, fundamentals, golf (elem. + inter.), modern dance, hockey, individual gym, riding* (beg. + elem. + inter. + colt training), speedaway, swimming (majors), tennis (elem. + inter.).

Second Quarter: Basketball, badminton (elem. + inter.), fencing, folk dancing, fundamentals, gymnastics, modern dance (elem. + inter.), individual gym, riding* (beg. + elem. + inter. + colt training), riflery, skating (elem. + figure), skiing (beg.), recreation workshop, stunts and tumbling.

Third Quarter: American country dance, badminton, (elem. + inter.), dance composition, dance survey, elementary games, fencing, individual gym, modern dance (elem. + inter.), riding* (beg. + elem. + inter. + colt training), riflery (elem. + inter.), skating (elem. + figure), skiing (beg. + elem. + inter. + ad), recreation workshop, stunts and tumbling, volleyball.

Fourth Quarter: Archery (elem. + inter.), badminton (elem. + inter.), outdoor education, dance survey, dance workshop, golf (elem. + inter.), individual gym, lacrosse, riding* (beg. + elem. + inter. + colt training), softball, swimming (majors), tennis, (elem. + inter.).

Required of freshmen and sophomores. 3 periods; 1 cr.

5, 6, 7, 8. Physical Education. Elective courses for juniors and seniors. Elect from activity courses listed above. 2 hrs.; 1 cr.

11, 12, 13, 14, 15, 16, 17, 18. Physical Education. Additional elective courses open to freshmen, sophomores, juniors, and seniors respectively may be chosen from the lists under 1, 2, 3, 4. 2 hr.; 1 cr.

Theory Courses

23. Principles of Physical Education. The aims, objectives, and principles of physical education and the historical factors which have influenced the physical life of nations. Mr. Martin and Miss Browne. 3 lec.; 3 cr.

24. Organized Camping. The methods, objectives, and purposes of organized camping; standards, facilities, equipment, food, sanitation, health, and safety requirements; program planning and leadership qualifications; integration of camping in the public schools. Mrs. Wooster. Elective for sophomores, juniors, and seniors (by permission of instructor). 3 lec.; 3 cr.

(36). Recreation Leadership. History, trends, community organization, financial aspects of administration, program planning, and leadership of community recreation, including playgrounds. Principles and philosophy of recreation. Miss Baier. Elective for sophomores, juniors, and seniors. 3 lec.; 3 cr.

* See Required Costumes, Fees and Equipment.

53, 54. The Theory of Teaching Dance. A survey of methods, materials, and techniques in teaching dance. Includes instruction in performance and teaching of rhythms, social, folk and square dance, first semester; modern dance, second semester. Miss Jacobs. Prereq.: concurrent with second quarter: folk and square dance; concurrent with third quarter: modern dance (elem.); concurrent with fourth quarter: modern dance (inter.). Open to Physical Education majors or by permission of instructor. 2 lec.; 1 lab.; 2 cr.

55. Remedial Gymnastics. The adaption of exercise to individual needs, capacities, and limitations; causes and treatment of physical abnormalities. Theory and technique of massage. Mrs. Wooster. Prereq.: Zool. 17-18; Zool. 19 or concurrently. 2 lec.; 2 lab.; 3 cr.

56. Health Education. A general health course designed to acquaint the student with methods, materials and principles of teaching school health. First Aid, safety education, health examination, and recognition and prevention of disease. Miss Clifford. Open to Physical Education majors and others by permission of instructor. Prereq.: Zool. 17. 3 lec.; 3 cr.

63, 64. The Theory of Teaching Team Sports for Women. The methods involved in the teaching of team sports and lead-up games with emphasis on coaching methods and techniques of officiating. Discussion of equipment, history, tactics, and rules of each sport. Miss Stone. Prereq.: Elementary courses in team sports. 2 lec.; 1 lab.; 2 cr.

66). Administration of Physical Education in Secondary Schools. Administrative methods in the conduct of physical education, health education, and recreation. The planning of programs and policies in the light of past and present philosophies and in regard to current programs, facilities, equipment, selection of staff, and public relations. Miss Browne. 3 lec.; 3 cr.

73, 74. The Theory of Teaching Individual Sports for Women. The methods and principles involved in the teaching of tennis, badminton, bowling, skiing, skating, golf, and archery. The history, equipment, courtesies, rules, techniques, and strategy of each sport will be discussed. Miss Beckwith and Miss Mills. Prereq.: Elementary work in the courses listed above. Open to junior and senior majors or others by permission of instructor. 1-2 lec.; 1-2 lab.; 1-2 cr.

P.E.-Ed. 91. Problems in the Teaching of Physical Education for Women. The methods, materials, and organization of a comprehensive program of activities for use primarily in the elementary school and in recreation programs. An elementary unit on testing and measurement procedures at various age levels is included. Miss Newman. Prereq.: Elementary games or its equivalent. 3 lec.; 3 cr.

Ed-P.E. (92), 92. Directed Teaching of Physical Education for Women. Opportunity for teaching physical education activities under direction, primarily in the elementary and secondary schools. Miss Newman. Prereq.: P.E.-Ed. 91 or concurrently. 1 lec.; 2-5 hr. lab.; 6 cr.

Ed-P.E. (96). Recreation Field Work. Opportunity for participation in the planning and operation of a variety of recreation programs, under direction, in nearby clubs and community centers. Prereq.: P. E.-Ed. 91 or concurrently: Miss Baier. 1 lec.; 2-5 hr. lab.; 6 cr.

PHYSICAL SCIENCE

(See Geology and Geography)

PHYSICS

HARRY H. HALL, *Professor;* HORACE L. HOWES, *Professor Emeritus;* JOHN A. LOCKWOOD, *Professor;* DAVID G. CLARK, *Associate Professor;* JOHN E. MULHERN, JR., *Associate Professor;* LYMAN MOWER, *Associate Professor;* ROBERT E. HOUSTON, JR., *Associate Professor;* LAURENCE J. CAHILL, JR., *Associate Professor;* SIDNEY R. BUTLER, *Assistant Professor;* ROBERT H. LAMBERT, *Assistant Professor;* GENE W. ADAMS, *Instructor;* JAMES H. TRAINOR, *Instructor;* JOEL E. HENKEL, *Instructor*

1-2. INTRODUCTORY PHYSICS. Mechanics, properties of matter, heat, magnetism, electricity, wave motion, sound, and light. Demonstration lectures, laboratory, and recitation. A knowledge of high school algebra and plane geometry is essential. This course is not intended for students in the College of Liberal Arts who expect to complete major requirements in Physics. 2 lec.; 1 rec.; 1 lab.; 4 cr.

9. ELEMENTARY PHYSICS. An elementary course with emphasis on selected topics from the various fields of physics. A knowledge of high school algebra and plane geometry is a prerequisite. Open only to students in the College of Agriculture. 1 lec.; 2 rec.; 1 lab.; 4 cr.

18. GENERAL PHYSICS I. Fundamental concepts of physics, This is Part I of a three part sequence, of which Parts II and III are selected topics chosen for deeper and more rigorous treatment. Prereq.: Math 21 or 25 passed, or taken concurrently. Must be taken as the introductory course for Physics majors in the College of Liberal Arts; cannot be counted for major credit. 2 lec.; 2 rec.; in alternate weeks one of the recitations is a laboratory exercise; 4 cr.

23, 24. GENERAL PHYSICS II, III. Selected topics from kinematics and dynamics, kinetic theory, electrostatics, electromagnetism, wave motion, relativity, and quantum theory. Prereq.: Phys. 18, Math. 22 or 26. Must be taken as the introductory course for Physics majors in the College of Liberal Arts; cannot be counted for major credit. 2 lec.; 1 rec.; 1 lab.; 4 cr.

31-32. PHYSICAL MECHANICS. An analytical treatment of classical mechanics covering the methods of statics and dynamics of particles and rigid bodies, both in a plane and in space, and the application of these methods to physical problems; oscillations; constraind motion; generalized co-ordinates and Lagrange's Equations. Prereq.: Phys. 23, 24, Math. 51-52 passed or taken concurrently. 3 lec.; 4 cr.

34. ELECTRICITY AND MAGNETISM. A careful analysis of the concepts of electrostatics, magnetostatics, dielectric theory, alternating currents, and electromagnetic field theory, leading to Maxwell's equations. Prereq.: Phys. 23, 24, Math. 51-52 passed or taken concurrently. 3 lec.; 4 cr.

35-36. EXPERIMENTAL PHYSICS I AND II. Experiments in optics, heat, electricity and magnetism, and atomic physics. Prereq.: Phys. 31-32, 34 and 37, taken concurrently. Phys. 35: 2 lab.; 1 lec.; 3 cr. Phys. 36: 2 lab.; 2 cr.

37. MODERN PHYSICS. An introduction to twentieth century physics, including the structure of atoms and nuclei, basic ideas of quantum mechanics and solid state theory. Prereq.: Phys. 23, 24, Math. 23, 24. 3 lec.; 3 cr.

38. PHYSICAL ELECTRONICS. An introductory course in basic electronic phenomena, covering such topics as elementary circuit theory, electron emission, vacuum tube characteristics, vacuum tubes as circuit elements, and gaseous discharge. 3 lec.; 3 cr.

81. PHYSICAL OPTICS. Starting with Maxwell's Equations and covering the nature of light, interference, diffraction, polarization, and related phenomena. Prereq.: Phys. 34, Math. 24. 3 lec.; 3 cr.

82. Thermodynamics. Temperature, work, first and second laws, ideal gases, reversibility and irreversibility, Carnot cycle, entropy, properities of pure substances, thermodynamic applications to pure substances, introduction to the principles of statistical mechanics. Prereq.: Phys. 23, 24, Math. 51-52 passed or taken concurrently. 3 lec.; 3 cr.

91. Atomic Physics. An introduction to quantum mechanics with applications to atomic and molecular spectra. Prereq.: Phys. 34, 37. 3 lec.; 4 cr.

92. Nuclear Physics. Natural radioactivity, nuclear reactions, nuclear scattering, models of the nucleus, high energy nuclear physics, cosmic rays. Prereq.: Phys. 91. 3 lec.; 4 cr.

93. Introduction to Theoretical Physics I. (Mechanics). The subject matter will depend upon the background of the class and will include such topics as mechanics of particles, planetary motion, rigid bodies, and introduction to advanced dynamics, theory of vibrations (particles, strings, and membranes), elasticity, hydrodynamics, sound and kinetic theory. Prereq.: Math. 51-52, and Phys. 31-32 or equivalent. 4 lec.; 5 cr.

94. Introduction to Theoretical Physics II. (Electromagnetic Theory). A review of electrostatics and magnetostatics followed by an introduction to the application of Maxwell's Equations to such topics as the propagation of plane waves, the study of wave guides and resonant cavities, and the theory of scattering, radiation from dipoles, atoms and molecules, the electron theory of dielectrics, and the electromagnetic theory of light. Prereq.: Math. 51-52, and Phys. 34, 37 or equivalent. 4 lec.; 5 cr.

95-96. Experimental Physics III-IV. Work of research type. Special problems are assigned to the individual student. Prereq.: Senior standing in Physics. 2 lab.; 3 cr.

97-98. Physical Colloquium. Participation in departmental colloquium, reading, and study. Prereq.: Senior standing in Physics. 1 cr. May be taken more than once.

99. Special Topics. Any selected topics not sufficiently well covered in a general course. Prereq.: Math. 51-52 passed or taken concurrently, and senior standing in Physics 1, 2, or 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

POULTRY SCIENCE

Winthrop C. Skoglund, *Professor;* Richard C. Ringrose, *Professor;* William R. Dunlop, *Professor;* Alan C. Corbett, *Associate Professor;* Walter M. Collins, *Associate Professor;* Samuel C. Smith, *Assistant Professor;* Richard Strout, *Assistant Professor*

(2.) Poultry Production. The general principles of poultry husbandry and their practical application. Factors of culling, breeding, housing, feeding, marketing, diseases and parasites, incubation, and management. Mr. Skoglund. 2 lec.; 1 lab.; 3 cr.

3. Avian Biology. The anatomy, physiology, and endocrinology of the fowl. Mr. Strout. 2 lec.; 2 cr. (Alternate years; offered 1962-63.)

4. Poultry Selection and Reproduction. The theory and principles involved in selection of poultry, embryonic development, and incubation and brooding practices. Mr. Skoglund. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

6. Poultry Nutrition. The principles of feeding: analysis of recent experimental work and current feed problems. Mr. Ringrose. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered 1962-63.)

7. Poultry Housing. Design and construction of poultry houses and equipment; costs of materials; management principles. Mr. Skoglund. 1 lec.; 1 lab.; 2 cr. (Alternate years; offered 1962-63.)

17. Poultry Judging. Advanced training in poultry selection. A judging team participates in an intercollegiate contest. Mr. Collins. 1 lab.; 1 cr.

19. Poultry Marketing. The preparation of poultry and eggs for market. Egg qualities and grades, candling and packaging; egg and poultry market conditions; practical instruction in processing poultry for market. Mr. Ringrose. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

24. Turkey Production. The general principles involved and their application to the production of market turkeys. Mr. Ringrose. 2 lec.; 2 cr. (Alternate years; not offered 1962-63.)

26. Poultry Management. The application of successful business principles to poultry farming; study of surveys and production costs. Visits are made to numerous poultry farms in order to study various types of enterprises. Mr. Skoglund. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered 1962-63.)

27, 28. Poultry Seminar. Students abstract experimental data and report on various current topics. Department staff. 1-hour conference; 1 cr.

29. Poultry Breeding. The principles of Mendelian and quantitative genetics applied to breeding for egg and meat production; genetic and environmental variation; selection, analysis of current breeding systems. Mr. Collins. 2 lec.; 1 lab.; 3 cr. (Alternate years; offered 1962-63.)

51-52. Avian Diseases. A survey of the diseases of domestic and wild fowl. The first semester, emphasizing the fundamentals of disease control, deals with etiology and diagnosis of bacterial and fungus diseases. A study is also made of the important helminth and protozoan parasites of fowl. The second semester is concerned with those avian diseases caused by virol entities and the nature cultures will be conducted in the laboratory. Mr. Corbett, Mr. Dunlop, and Mr. Strout. 2 lec.; 1 lab.; 3 cr. (Alternate years; not offered 1962-63.)

53, 54. Investigations In:

a. Poultry Breeding — Mr. Collins
b. Poultry Nutrition — Mr. Ringrose
c. Poultry Management — Mr. Skoglund
d. Avian Microbiology — Mr. Dunlop, Mr. Smith, and Mr. Strout

Elective only after consultation with the instructor in charge. Hours to be arranged 1 to 3 cr. Course may be repeated for credit.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

PSYCHOLOGY

HERBERT A. CARROLL, *Professor;* GEORGE M. HASLERUD, *Professor;* BRIAN R. KAY, *Associate Professor;* STANLEY I. BERGER, *Assistant Professor;* WALTER R. DURYEA, *Assistant Professor;* FREDERICK M. JERVIS, *Lecturer;* ROBERT G. CONGDON, *Lecturer;* WILLIAM W. LOTHROP, *Lecturer*

1, (1). GENERAL PSYCHOLOGY. The systematic study of human behavior, especially with reference to the fundamental principles governing the development of the individual, motivation, emotion, learning, perception, thinking, and individual differences. Mr. Haslerud, Mr. Kay, and Mr. Berger. Not open to juniors and seniors of the College of Liberal Arts. 3 lec.; 3 cr. *This course cannot be counted for major credit.*

32. INDUSTRIAL PSYCHOLOGY. A survey of the applications of psychology to business and industry. Communication and human relations, accident prevention, conditions of work, human engineering, motivation of workers, and an introduction to recruitment, selection, and training of personnel. Mr. Kay. Prereq.: Psych. 1 or the permission of the instructor. Not open to freshmen. 3 lec.; 3 cr.

37. DEVELOPMENTAL PSYCHOLOGY. Man's behavioral and psychological development and their relation to physical growth. Phylogenetic and ontogenetic development is examined and pertinent animal studies are introduced. The prenatal period is considered along with childhood, adolescence, and early maturity. The developmental methods of study are also an integral part of the course. Not open to freshmen. Mr. Duryea. 3 lec.; 3 cr.

44. PSYCHOLOGY OF PERSONALITY. An exploration into the meaning of the normal personality as seen in current psychological perspective. Expressive traits, perceptual orientations, and motives are viewed as interacting components of the personality structure. Case histories, personality tests, and experiments are employed as study methods. Mr. Duryea. Prereq.: Psych. 1 or 37 or 47. Not open to freshmen. 3 lec.; 3 cr.

47, (47). MENTAL HYGIENE. An examination of the fundamental emotional satisfactions desired by human beings and a consideration of the several ways in which these desires are thwarted. The mental conflicts growing out of such thwartings and ways of resolving them will be the central theme of the course. Specific applications of the principles of mental health will be made to the problems of college students. Mr. Berger, Mr. Congdon, and Mr. Lothrop. Not open to seniors in the College of Liberal Arts. 3 lec.; 3 cr. *This course cannot be counted for major credit.*

54. PSYCHOPATHOLOGY. A systematic examination is made of the more severer behavioral disorders as found in the major forms of the neuroses and psychoses. The ego defense mechanisms and the construct of anxiety are seen as central to the understanding of these disorders. The search for causes, the interpretation of symptoms, and the methods of treatment are considered in detail. Mr. Berger. Prereq.: Psych. 47. 3 lec.; 3 cr.

57. EXPERIMENTAL PSYCHOLOGY. A study of experimental methods in psychology, including discussion of theory and practices in applying these methods to a variety of psychological phenomena. Each student in the class will be responsible for an individual experimental project. Mr. Haslerud and Mr. Duryea. Prereq.: Psych. 1. 2 lec.; 1 lab.; 3 cr.

58. PSYCHOLOGY OF LEARNING. A study of the experimental support for and the practical implications of contemporary theories of learning. Mr. Haslerud. Prereq.: Psych. 1. 3 lec.; 3 cr.

60. PSYCHOLOGY OF MOTIVATION. A study of the drives and motives which underlie normal human behavior and the forms of adjustment which arise

when motives conflict or encounter external frustration. Prereq.: Psych. 1. 3 lec.; 3 cr.

63. Differential Psychology. A study of individual differences with special attention given to those who are intellectually gifted or mentally retarded. Prereq.: Psych. 1 or permission of instructor. 3 lec.; 3 cr.

67. Statistics in Psychology. A study of the problems and methods involved in the statistical treatment of quantitative data in psychology. The computation and interpretation of elementary statistical measures such as mean, median, standard deviation, and the various methods of correlation are considered in detail. Mr. Duryea. Prereq.: Psych. 1. 3 lec.; 3 cr.

77. Comparative Psychology. Consideration of similarities and differences in behavior of infra-human organisms at different phylogenetic levels as aids to understanding how behavior evolved and to the clarification of behavior principles. The historical and biological foundations of such special topics as instinct, consciousness, abnormal behavior, social influence, reasoning and judgment are surveyed by use of the comparative method. Mr. Duryea. Prereq.: Psych. 1. 3 lec.; 3 cr.

78. Physiological Psychology. A study of the relation between behavior and the structure of the organism. Special attention to the sensory, nervous, and glandular functions as the organic base for motivation, emotion, learning, etc. Mr. Haslerud. Prereq.: Psych. 1. 3 lec.; 3 cr.

82. Social Psychology of Industry. The exploration of social structure and function of industrial organizations. Emphasis will be placed on leadership, role, and organization theories and a critical evaluation of their supporting experimental evidence. Mr. Kay. Prereq.: Psych. 1. 3 lec.; 3 cr. (Not offered 1962-63.)

83. Systematic Psychology. The complex expansion of contemporary psychology as seen in historical perspective. A consideration of some of the major antecedents in philosophy, theology, and the physical sciences. Emphasis is placed on the subsequent extensive development of psychology in the United States in the form of complementary schools and systems of thought and research. Mr. Duryea. Prereq.: Psych. 1. 3 lec.; 3 cr.

89. Mental Hygiene in Teaching. A study of the fundamental needs of human beings, with emphasis on the mental and emotional conflicts of secondary-school students arising from the thwarting of these needs. Ways of recognizing these conflicts by their manifestations, and of helping students to resolve them will be treated extensively in the course. Attention will also be given to the mental hazards of the teaching profession. Mr. Jervis. Prereq.: Senior or graduate status in Psychology or Education. 3 cr. *Not open to students who have completed Psych. 47.*

93, (93). Special Topics in Psychology. This course will be taught by a different instructor each year. The instructor will present advanced material in an area in which he has developed specialized knowledge through research and special study. Students may repeat the course but they may not duplicate areas. Instruction may be given in any one of the following: (A) Clinical, (B) Developmental, (C) Differential, (D) Experimental, (E) Industrial, (F) Learning and Perception, (G) Personality, (H) Physiological, (I) Psychological Evaluation, (J) Psychopathology, (K) Statistics, (L) Systematic. This course does not overlap with Psychology 98, Seminar in Psychology, in which senior majors in psychology write their comprehensive papers. Prereq.: 12 semester credits in Psychology and permission of instructor. 3 lec.; 3 cr.

95. Advanced General Psychology. A systematic study of current psychology to help the student, by lectures, demonstrations, and reports,

to obtain a broad, integrated view of the subject as both science and art. Mr. Haslerud. Prereq.: 12 semester credits in Psychology. 3 lec.; 3 cr. *Required of all undergraduate majors in Psychology.*

98. Seminar in Psychology. An extensive term paper on subjects chosen by the individual student. This project in library research meets the Department's requirement for a comprehensive paper. Prereq.: 15 semester credits in Psychology. 3 cr. *Required of all undergraduate majors in Psychology.*

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

RECREATION EDUCATION

(See Physical Education Teacher Preparation Curriculum for Women)

RESERVE OFFICERS TRAINING CORPS

Department of Military Science

Lieutenant Colonel Joseph P. Stabler, *Artillery, Professor;* Lieutenant Colonel Warren W. Witt, Infantry, *Assistant Professor;* Major John B. Hammond, Infantry, *Assistant Professor;* Major Robert E. Belford, Artillery, *Assistant Professor;* Captain Paul D. Tomlingson, Infantry, *Assistant Professor;* Master Sergeant Edison E. Temple, *Assistant;* Sergeant First Class Clinton F. Ramey, *Assistant;* Sergeant First Class John P. McInnes, *Assistant;* Staff Sergeant Norman D. Tufts, *Assistant;* Master Sergeant Clarence P. Andersen, U. S. Army (Retired), *Army ROTC Property Officer*

The Army Reserve Officer Training Corps offers a course of instruction leading to a commission as a second lieutenant in one of fifteen branches of the United States Army. Successful completion of the course and the award of a baccalaureate degree by the University qualify the graduate for this commission.

The Military Science courses follow the student's normal academic progression, i.e., a student takes Military Science 13-14 during his freshman year and Military Science 23-24 during his sophomore year. If he elects and is accepted for Advanced ROTC, he will take Military Science 33-34 and Military Science 43-44 during his junior and senior years respectively.

The Army basic course satisfies the two-year required military training of the undergraduate by providing instruction in military subjects as noted below.

To qualify for the advanced course and its military allowance of $27.00 per month, applicants are required to have earned a minimum overall cumulative grade average of 2.0, to have demonstrated positive leadership potential in the basic course, to be physically qualified, to be selected by the Professor of Military Science, and to be approved for admission to the program by the President of the University.

M.S. 13. Fundamentals of Military Science. The Organization of the Army and ROTC and the Army and National Security. Practical training in leadership, marksmanship, military drill, and command provides a balanced picture of the mission of the Army and an introduction to the military program. Two hours of classroom instruction plus leadership laboratory. 2 cr.

M.S. 14. Concurrent Development. An integrated course consisting of leadership laboratory conducted by the Army ROTC Department and an elective University subject which, in the opinion of the student's faculty adviser and the Professor of Military Science, will develop the cadet's potential. The elective course must be selected from the areas of effective communication, science comprehension, general psychology, or political developments and political institutions. A course falling within one of these areas, which is also required in the student's college curriculum, is acceptable. Credit is awarded after satisfactory completion of the elective course and leadership laboratory. Cr.

M.S. 23. American Military History. A survey of American military history from the origins of the American Army to the present with emphasis on the factors which led to the organizational, tactical, logistical, operational, strategic, social and similar patterns found in our present-day Army and society. Practical application of leadership, drill, and command. Two hours of classroom instruction plus leadership laboratory. 2 cr.

M.S. 24. Land Navigation and the Principles of Military Operations. The science of military maps and land navigation. An introduction to military operations with emphasis on the principles of firepower and maneuver. Practical application of leadership, drill, and command. Two hours of classroom instruction plus leadership laboratory. 2 cr.

M.S. 33. Professional Development. Military instruction for two hours each week plus a three-credit academic subject which, in the opinion of the student's faculty adviser and the Professor of Military Science, will contribute to the cadet's potential as a prospective Army officer. The academic subject must be selected from the areas of effective communication, science comprehension, general psychology, or political developments and political institutions. Military instruction, a prerequisite for cadet subsistence pay and commissioning, will include leadership laboratory and branches of the Army. The integrated course of instruction outlined above must provide for a minimum of five hours of instruction per week. Credit is awarded upon satisfactory completion of the elective course and leadership laboratory. Cr.

M.S. 34. Military Professional Development. The principles of leadership. The theory and practice of military teaching methods. Small unit tactics. Military communication facilities. Leadership laboratory to include exercise of command of small units. Minimum of five hours of instruction per week. 3 cr.

M.S. 43. Principles of Command and Staff. An introduction to the military staff and military staff work to include the relationship between command and staff, relationship of staff to subordinate units, command channels, liaison, military intelligence, and training management. Military logistics to include movements, motor transportation, and supply and evacuation. Army administration and military law. Leadership laboratory to include practical application of leadership principles and exercise of command. Minimum of five hours of instruction per week. 3 cr.

M.S. 44. Professional Development. Military instruction for two hours each week plus a three-credit academic subject which, in the opinion of the student's faculty adviser and the Professor of Military Science, will contribute to the cadet's potential as a prospective Army officer. The academic subject must be selected from the areas of effective communication, science comprehension, general psychology, or political developments and political institutions. Military instruction, a prerequisite for cadet subsistence pay and commissioning, will include leadership laboratory. service orientation, and a study of the role of the United States in world

affairs. The integrated course of instruction outlined above must provide for a minimum of five hours of instruction per week. Credit is awarded upon satisfactory completion of the elective course and leadership laboratory. Cr.

Army Flight Training. A program conducted by licensed flight instructors which includes a thirty-five hour ground school and a thirty-six hour flying phase. Successful completion may lead to a private pilot's license and a career in Army aviation. Open to Army ROTC senior advanced course students who can meet physical and aptitude requirements. No credit.

Department of Air Science

Colonel John F. Britton, USAF, *Professor;* Lieutenant Colonel William J. Lucky, *Assistant Professor;* Major Eugene J. Cogan, USAF, *Assistant Professor;* Major Donald A. Lundholm, USAF, *Assistant Professor;* Captain Malcolm B. Robertson, *USAF, Assistant Professor;* Captain Robert G. Moore, *Assistant Professor;* Staff Sergeant Johnstone B. Richardson, Jr., USAF, *Assistant;* Airman First Class John B. MacDonald, USAF, *Assistant;* Staff Sergeant Ralph G. Ordway, USAF, *Assistant;* Airman First Class James H. Allen, USAF, *Assistant;* Technical Sergeant Joseph R. Gaudreau, USAF, *Assistant*

Entrance requirements for basic Air Force ROTC are lenient, while those for advanced are quite strict. Selection for advanced in both the flying and non-flying categories is based on character, attitude, academic record, and leadership ability. Each cadet selected for advanced Air Force ROTC must be a student in good standing with the University and Air Force ROTC, and must successfully complete a battery of officer qualification tests.

About one-third of those admitted into advanced are physically qualified for, and desire, flight training as pilots or observers. Pilot cadets will receive, during their senior year, 36½ hours of flight instruction under the supervision of the Federal Aviation Agency, leading toward a private pilot's license. As there is a special need for Air Force officers with engineering backgrounds, students taking such courses are urged to apply for the advanced phase. In addition to uniforms provided to all cadets enrolled in AFROTC, advanced cadets receive a subsistence allowance during the junior, and senior years, including summer periods.

A.S. 13. Air Leadership I. Air laboratory of one hour each week. Course is mandatory for all Air Science freshmen. In addition, the student must succesfully complete a University course of at least two credits during the semester. Normally English I will complete this requirement. If such is not the case, History I will suffice for Liberal Arts; Chemistry 1, 3, or 5 for Agriculture and Technology. Variations from these courses will be made through the Department of Air Science. No credit.

A.S. 16. Foundations of Air Power I. A general survey of air power, including an understanding of its elements and potentials, research and development, air industries, airlines and airways, control, navigation, and propulsions systems, space vehicles, and military instruments of national security. Three hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

A.S. 25. Foundations of Air Power II. A general survey of the roots and development of aerial warfare, the employment of air forces, the impact of changing weapon systems, operations in space, missiles, bases and facilities, and operations. Three hours of classroom instruction plus one hour of leadership laboratory. 3 cr.

A.S. 28. Air Leadership II. Air leadership laboratory of one hour each week. Course is mandotary for all Air Science sophomores. In addition, the student must successfully complete a University course of at least two credits during the semester. Normally one of the following will complete this requirement: English 14, 16; Humanities 2; Foreign Languages; Biology 2, 3; Chemistry 2, 3, 4; Geology 2; Physics 2, 9, 18, 23, 24; Mathematics 2, 3, 7, 8, 21, 22, 23, 24; Education 41; Economics 2; Zoology 48; and Agricultural Engineering 22, 24. The student must designate a substitute course during registration for that semester to the Department of Air Science. Variations from these courses will be made through the Department of Air Science. No Credit.

A.S. 35. Air Force Officer Development I. Knowledge and skills required of a junior officer in the Air Force. This includes staff organization and functions, communication, instruction, and techniques of problem solving. Leadership laboratory, as provided by command and staff positions with the cadet wing, prepare the student for the summer training program which normally follows immediately after A.S. 36. Minimum of four hours of formal instruction. Prereq.: A.S. 16, 25. 3 cr.

A.S. 36. Air Force Officer Development II. Principles and practices of leadership. This includes basic psychology of leadership, the military justice system, and application of problem solving techniques and leadership theory to simulated and real Air Force problems. Leadership laboratory, as provided by command and staff positions with the cadet wing, prepare the student for the summer training program which normally follows immediately after A.S. 36. During summer training the student will have the opportunity to become familiar with life at an Air Force base and obtain orientation flights in the latest type aircraft in the Air Force. Minimum of four hours of formal instruction. 3 cr.

A.S. 45. International Relations. This course is devoted to the study of major factors underlying international tensions — balance of power concepts, the League of Nations, the United Nations, and regional security organizations; and the use of the super powers — the United States and Russia. Opportunity to qualify for a private pilot's license is offered to selected cadets. Minimum of four hours of formal instruction and leadership laboratory. 3 cr.

A.S. 46. Military Aspects of World Political Geography; and the Air Force Officer. Course is devoted to study of the concepts of the military aspects of political geography, maps and charts, factors of power, and the geographic influences upon political problems with a geographical analysis of the strategic areas. A study is also made of materials to help the cadet make a rapid, effective adjustment to active duty as an officer of the Air Force. Minimum of four hours of formal instruction and leadership laboratory. 3 cr.

RUSSIAN

(See Foreign Languages and Literatures)

SECRETARIAL STUDIES

(See Whittemore School of Business and Economics)

SOCIAL SCIENCE

This course is given under the auspices of the Division of Social Science of the Faculty of the College of Liberal Arts. The Division includes the departments of Government, History, Hotel Administration, Psychology, and Sociology, and the Whittemore School of Business and Economics.

81, (81). Internships. Field work in a department, agency, or institutional setting of the state or local government, or in a selected and approved private agency. The work will be under the supervision of the department or agency to which the student is appointed. The chairman of the department involved or his representative will be responsible for arranging the student's individual internship program. Prereq.: Internships for seniors only may be approved by the departments of Government, History, Psychology, or Sociology or the Whittemore School of Business and Economics. Not more than 16 credits. *No more than 9 credits may be counted toward the completion of major requirements.*

SOCIOLOGY

Richard Dewey, *Professor;* Charles W. Coulter, *Professor Emeritus;* Melville Nielson, *Associate Professor;* Stuart H. Palmer, *Associate Professor;* Melvin T. Bobick, *Assistant Professor;* Maurice Richter, Jr., *Assistant Professor;* Pauline Soukaris, *Instructor;* Owen B. Durgin, *Statistician in the Agricultural Experiment Station*

1. Introductory Sociology. Man's social and cultural relationships as revealed in his customs and institutions. Social theory, methods and techniques of research, and current research findings. 3 lec.; 3 cr.

2. Social Problems. How culture in the form of customs and institutions is related to such human problems as crime and delinquency, alcoholism, physical and mental disease, sex pathologies, poverty, old age, broken families, and racial and religious prejudices. *Especially for students who do not intend to major in Sociology.* Prereq.: Soc. 1. 3 lec.; 3 cr.

27, (27). The Family. The family as a social institution with special attention given to the contemporary United States family. *Not open to freshmen.* 3 lec.; 3 cr. (Formerly Soc. 72.)

33. Cultural Anthropology. The concepts and methods of anthropology. The structure of culture: culture and personality; economic, family, educational, political, and religious institutions; art; language. Data concerning various primitive societies are presented. 3 lec.; 3 cr.

44. Social Psychology. Individual actions, attitudes, ideas, and perceptions as influenced by socio-cultural environments. Individual-cultural relations in education, religion, economics, aesthetics, ethics, and deviant behavior. 3 lec.; 3 cr.

45. Rural-urban Sociology. Application of sociology principles to the study of customs and institutions in rural and urban settings. Differentiation between influences upon community organization of culture on the one hand and population size and density on the other. Prereq.: Soc. 1. 3 lec. 3 cr.

52. Population Problems. Basic concepts of population analysis; theories of population change; the world population growth in the past and present; population problems and policies in hungry and affluent nations. 3 lec.; 3 cr.

54. Culture Change. Theories of culture change are evaluated. The processes of discovery, invention, diffusion, and acculturation are illustrated by selected anthropological studies of the culture of non-literate and literate societies. Prereq.: Soc. 1 or 33. 3 lec.; 3 cr.

57. Social Stratification. Social class systems with special attention given to the class structure in the United States. Prereq.: Soc. 1. 3 lec.; 3 cr.

58. Minority Groups. Majority-minority group relations with special attention given to racial, religious, and ethnic minority groups in the United States. Prereq.: Soc. 1. 3 lec.; 3 cr. *Sociology 58 is not open to students who have credit for Sociology 34.*

59. Aging in the American Society. Social differentiation on the basis of age groups, with the aged in the contemporary American society being emphasized. Attitudes and behavior toward the aged, attitudes and behavior of the aged, and problems of the aged in society. Proposed programs for change in the treatment and behavior of the aged. 3 lec.; 3 cr. (Not offered 1962-63.)

62. Social Movements. The factors related to the origin and development of reform, revolutionary, religious, and other social movements. The organization, structure, tactics, and leadership of social movements. The purposes and consequences of selected movements, as well as to the relationships between social movements and social change. Prereq.: Soc. 1. 3 lec.; 3 cr. (Not offered 1962-63.)

71, (71). Criminology. An analysis of the scientific study and of the control of crime. The following are considered in some detail: indexes, rates and theories of crime and delinquency, police, courts, probation, prison and parole. The student attends one hour lecture and one hour discussion each week. 3 cr.

73, 74. Introduction to Social Welfare. The field of social welfare: history, public welfare, case work, social group work, community organization for social welfare. For Sociology majors and students enrolled in the Social Service curriculum; others may be admitted by permission of the instructor. 3 lec.; 3 cr.

75-76. Methods of Social Research. Analysis of research problems. Designing field studies and experiments. Demonstration and practice in sampling, schedule construction, and interviewing techniques. First semester: use of elementary statistical techniques in analysis of prepared data. Second semester: methods of observation. For Sociology majors and students enrolled in the Social Service curriculum; others may be admitted by permission of instructor. 3 lec.; 3 cr.

85, 86. Development of Sociological Theory. Social thought from Plato to the present. First semester: the works of selected individuals from Plato to Comte. Second semester: the 19th century European social philosophers; the ideas of U. S. social scientists, especially upon their contributions to present day sociological thought. Students not majoring in Sociology may be admitted by permission of the instructor. 3 lec.; 3 cr.

88. Crime Control. A seminar course on the theory and practice of preventing crime and delinquency and of rehabilitating the criminal and the delinquent. There will be a number of lectures by, and discussions with, various penologists. Prereq.: Soc. 71. Permission of instructor. 3 cr. (Limited to 15 students.)

92. Fields of Sociology. Various subject areas of sociology: their growth and development, their relationship to one another, and their current status with regard to research and theory. Recent developments and the newer

subject areas of sociology. Future developments as extensions of present trends. Students not majoring in Sociology may be admitted by permission of the instructor. 3 lec.; 3 cr.

93. Communication in Society. Social aspects of the communication process. Cultural prerequisites of communication; premises, purposes, and procedures of communication content analysis; communication in crowd, mass, and public; the organization of mass communication systems in traditional totalitarian and democratic societies; and audience reactions to communicated messages. Prereq.: Permission of the instructor. 3 lec.; 3 rc.

97. Social Welfare Field Experience. To give the student an understanding of social welfare through observation and participation. Students will work in a social welfare setting for a period of eight weeks (or its equivalent). This field work is generally done during the summer following the junior year. Weekly seminar sessions constitute the classroom work of the course. Prereq.: Soc. 73, 74 and permission of the instructor. 6 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

SPANISH

See Foreign Languages and Literatures

SPEECH AND DRAMA

Joseph D. Batcheller, *Associate Professor;* Edmund A. Cortez, *Professor;* John C. Edwards, *Associate Professor;* Phyllis D. Williamson, *Instructor;* Jamil I. Toubbeh, *Instructor*

B. Speech Improvement. All entering freshmen and transfer students are required to take a speech test. They are classified as Group I, having no apparent problem; Group II, needing speech improvement; or Group III, having relatively serious speech problem. Those students classified in Group III are required to meet individually or in groups with the staff and students in clinical practice for non-credit Speech Improvement until such time as they have made sufficient improvement. A student may be remanded to Speech Improvement by any instructor with the approval of the Speech staff. This course replaces English B. Mrs. Williamson. No cr.

5, (5). Basic Speech. A beginning course in the social, psychological, physiological, and phonetic bases of speech. Projects in informal public speaking, oral interpretation, discussion, and elementary phonetic transcription are used: (1) to illustrate the bases and (2) for the improvement of the individual student. This course is strongly recommended for those students who are classified in Group II on the speech test. Required of all majors, but without major credit. Mrs. Williamson. 3 rec.; 3 cr.

15, (15). Public Speaking. The basic speaker, materials, presentation, occasion, and audience relationships. An introduction to extemporaneous and impromptu speaking for the purposes of informing and convincing. Practice in speaking with evaluation and constructive comment by the instructor and audience. Cannot be counted for major credit. This course replaces English 35 and should not be taken by anyone who has credit for English 35. Mr. Cortez and staff. 3 rec.; 3 cr.

21. Introduction to Theater Arts. The basic elements common to the varied media of theater; legitimate, musical, cinema, and television. The place of the theater in our lives. An introduction to theater practices from the script to production. 2 lec.; 1 lab.; 3 cr.

24. Theater and Its Drama. The relation of theater and its drama to the society in which it is produced. A comparative study of outstanding modern plays and historical counterparts. 3 lec.; 3 cr.

25. Discussion. The means and ends, values, and limitations of the various types of discussion. Group dynamics, logic and evidence, and parliamentary procedure as applied to learning and problem solving. Practice in using various methods to gain the objectives of discussion. This course replaces English 33 and should not be taken by anyone who has credit for English 33. Mrs. Williamson. 3 rec.; 3 cr.

28. Debate. The various forms of advocacy as an extension of discussion. The analysis of propositions, the construction of a case, logic and ethical persuasion, and the presentation of speeches of advocacy. The course replaces English 34 and should not be taken by anyone who has credit for English 34. Mrs. Williamson. 3 rec.; 3 cr.

29, (29). Discussion and Debate Practice. Responsible preparation for and participation in intra- and inter-collegiate discussion or debate. May be repeated to a total of 4 credits toward graduation. Cannot be counted for major credit. Prereq.: Debate and approval of the instructor. Mrs. Williamson. 1 cr.

37, (37). Stagecraft. An introduction to stage and television scenery, costumes, properties, lighting, sound, and backstage organization. Practical application in University Theater productions. This course replaces Arts 35 and should not be taken by anyone who has credit for Arts 35. Mr. Toubbeh. 1 lec.; 2 lab.; 3 cr.

40. Scenic Design and Lighting. A study of the problems of stage design and lighting for theater and television. Individual projects, models, and participation in University Theater and television productions. Prereq.: Stagecraft or approval of the instructor. 1 lec.; 2 lab.; 3 cr.

43. Acting. The relation of the actor to other theater workers in producing a play. Analysis of the role, creation of images, rehearsal and performance problems of legitimate theater and television. This course replaces English 47 and should not be taken by anyone who has credit for English 47. Prereq.: 6 credits in Speech and Drama or approval of the instructor. 1 lec.; 2 lab.; 3 cr.

45, (45). Theater Practice. Application of the theory of acting, directing, or the technical aspects of production to specific assigned responsibilities in University Theater productions. May be repeated to 4 credits toward graduation, but cannot be counted for major credit. Prereq.: the basic courses in which the practice credit is taken and approval of the instructor. Mr. Batcheller. 1 cr.

49. Television and Radio Workshop. The application of basic theater techniques to electronic means of mass communication. The place of television and radio in our society. Production techniques. Actual practice in campus studios. Mr. Cortez. 1 lec.; 2 lab.; 3 cr.

52. Rhetoric in the Western World. A study of great speeches in the history of western civilization; an analysis of the reasons for their success or failure on a basis of the speaker, his materials, the logical and persuasive appeals, the audience background and attitudes, and the occasion. Of special interest to history, government, sociology, and psychology majors as well as students interested in relationships of language and social

problems. Prereq.: 6 credits in Speech and Drama or approval of the instructor. Mrs. Williamson. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

53. Speech Correction. Further study of the psychological, physiological, and phonetic bases of speech with the addition of the neurological, genetic, and physical bases towards the end of recognizing abnormalities of speech, some of their causes, and their basic therapy. Delayed speech, articulatory and voice disorders, foreign dialects, stuttering, and audiology are the principal problems studied. Prereq.: Basic Speech or approval of the instructor. Mrs. Williamson. 3 lec.; 3 cr.

56. Clinical Methods. A continuation of Speech Correction dealing with the theory of remedial practices for various speech problems and providing experience in speech therapy by demonstration and laboratory in conjunction with Speech Improvement. Prereq.: Speech Correction. Mrs. Williamson. 1 lec.; 2 lab.; 3 cr. (Alternate years; offered 1962-63.)

62. Directing. The analysis of the script, the determination of specific treatment of the production, the development of a prompt script, casting, rehearsal, and production for legitimate theater and television. This course replaces English 48 and should not be taken by anyone who has credit for English 48. Prereq.: 6 credits in Speech and Drama or approval of the instructor. 1 lec.; 3 lab.; 3 cr.

64. Speech for Prospective Teachers. Developing an adequate conversational form of speaking before the class; speech improvement for the prospective teachers; voice recording and analysis; oral interpretation of both prose and poetry; making and using visual aids; and the means of developing a communicative speaker-audience relationship. This course replaces English 36 and should not be taken by anyone who has credit for English 36. Mr. Cortez. 3 rec.; 3 cr.

WHITTEMORE SCHOOL OF BUSINESS AND ECONOMICS

Arthur W. Johnson, *Professor;* Carroll M. Degler, *Professor;* John A. Hogan, *Professor;* Ruth J. Woodruff, *Professor;* Doris E. Tyrell, *Associate Professor;* Sam Rosen, *Associate Professor;* Myra L. Davis, *Assistant Professor;* John A. Bergeron, *Assistant Professor;* Ronald D. Michman, *Assistant Professor;* John A. Bassett, *Instructor;* Russell W. Johnson, *Instructor;* Joseph E. Michael, Jr., *Part-time Instructor*

Business Administration

Note — Students who have completed two or more years of bookkeeping in preparatory school will be permitted to register for B.A. 3-4, *Intermediate Accounting,* upon passing, without academic credit, an examination covering material of B.A. 1-2.

Register for the following courses as B.A. 1, etc.

1-2. Principles of Accounting. The fundamentals of accounting. Theory of debit and credit; functions and classification of accounts; modern accounting records including special and columnar books. Adjusting entries, work sheets, and financial statements. Single proprietorship, partnerships, and introduction to corporations. Mr. Bassett and Mr. Russell Johnson. 3 lec.; 3 cr.

3-4. Intermediate Accounting. Corporation accounting principles and objectives of valuation, consignments, installment selling, depreciation and depletion, funds and reserves, application of funds, and analysis of financial statements. Mr. A. W. Johnson. Prereq.: B.A. 2. 3 lec.; 3 cr.

7-8. Cost Accounting. The relation of cost accounting to general accounting. The place of cost accounting in modern business. Types of cost systems and their application to particular lines of business. Careful analysis of methods of computing costs. Principles of cost control. Mr. A. W. Johnson. Prereq.: B.A. 2. 3 lec.; 3 cr.

9-10. Hotel and Restaurant Accounting and Control Systems. Current hotel and restaurant accounting and cost control systems. Includes a study of hotel financial reports and their interpretation. Mr. Russell Johnson. Prereq.: B.A. 1-2. 2 lec.; 1 lab.; 3 cr.

21-22. Commercial Law. The law of contracts, agency, sales, negotiable instruments, partnerships, and corporations. *Open to juniors and seniors.* 3 lec.; 3 cr.

23, (23). Business Communication. Report writing, including preparation of charts, forms and graphs; intra-office, inter-office, and inter-business communication; instruction data for employees, minutes of meetings, and manuals of company practices and procedures; business letters. Mr. Baier, Mr. Taylor. *Not open to freshmen.* 3 lec.; 3 cr.

24. Introduction to Business. An orientation toward the more advanced courses in business administration, or a one-semester terminal course for non-majors. The major fields and problems of business administration: production, distribution, finance, and control. Business in relation to the economy as a whole. *Open only to freshmen and sophomores.* 3 lec.; 3 cr.

34. Business Management. Principles and techniques of successful organization, management, and operation of business activities, including the qualifications, functions, and activities of the executive. *Open to juniors and seniors.* 3 lec.; 3 cr.

45. Principles of Selling. Principles and methods used by commercial and industrial concerns in selling to the ultimate consumer, middle man, and other businesses. Principles employed in personal selling in national sales organizations, manufacturers, producers, and in retail establishments. Mr. Michman. *Open to juniors and seniors.* 3 lec.; 3 cr.

46. Principles of Retailing. Methods and principles of operating chain, department, specialty, and unit stores. Retail location store layout and merchandise classification, sales and service policies, pricing, buying, and organization. Mr. Michman. Prereq.: Econ. 25. 3 lec.; 3 cr.

47. Principles of Advertising. Advertising as an element of marketing strategy for the firm. Management considerations involved in the selection of the appropriate form of advertising. Campaign planning, media selection, and effectiveness testing. Mr. Michman. Prereq.: Econ. 25. 3 lec.; 3 cr.

48. Sales Management. Principles of successful sales management, their application, merchandising, sales promotion, building a sales organization; advertising's place in sales management; sales policies, costs, and controls; selection, development, and training of sales staffs. *Open to juniors and seniors.* 3 lec.; 3 cr. (Not offered 1962-63.)

52. Market Analysis and Research. The nature, procedures, and applications of market research; probability and non-probability sample design; significance test. Mr. Michman. Prereq.: Econ. 25. 3 lec.; 3 cr.

55. Advanced Accounting. Advanced theory of accounting, corporate consolidations, insolvencies, realization and liquidation problems, estate accounting. Mr. A. W. Johnson. Prereq.: B.A. 4 or equivalent. 3 lec.; 3 cr.

56. Federal Tax Accounting. The federal income tax laws and accounting procedure in connection therewith: social security taxes, estate, and gift taxes. Mr. A. W. Johnson. Prereq.: B.A. 4, or permission of the instructor. 3 lec.; 3 cr.

57. Auditing. Procedure and practice in the verification of records, analysis of accounts, and the presentation of conclusions. Responsibilities of the auditor and the procedure and practice of preparing reports. Mr. A. W. Johnson. Prereq.: B.A. 4 or equivalent, or permission of instructor. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

61. Analysis of Financial Statements. Analysis and interpretation of accounting data as presented in corporate balance sheets and operating statements for the use of management in controlling its business. Comparative analysis, uses of both operating and financial statements. Mr. A. W. Johnson. Prereq.: B.A. 4 or equivalent or permission of instructor. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

68. Personnel Administration. Methods, techniques, and psychology employed in personnel administration from the standpoint of the executive. The case study method is used. Mr. Hogan. Prereq.: Econ. 2. 3 lec.; 3 cr.

70. General Insurance. The field of insurance; social value; physical and moral hazards; risk, its nature and economic significance; reinsurance; types of insurance coverage; fire, casualty, life, social; fidelity and surety bonds. Mr. A. W. Johnson. 3 lec.; 3 cr.

Secretarial Studies

Register for the following courses as Secl. 1, etc.

1-2. Shorthand. Principles of Gregg shorthand with practice in transcribing from shorthand plates and class notes. Secl. 7-8 must be taken in conjunction with this course or precede it. Miss Tyrrell. Prereq.: Permission of instructor. 5 rec.; 3 cr.

3-4. Advanced Shorthand. A review of fundamental principles, the building of shorthand vocabulary, practice in taking dictation at increasing rates of speed, and practice in developing skill and speed in transcription. Miss Tyrrell. Prereq.: Secl. 2 or equivalent and permission of instructor. 5 rec.; 3 cr.

5, (5). Personal Use Typewriting. Practice in acquiring correct typing techniques, arranging letters, outlines, notes, themes, bibliographies, and simple tabulations. Open to any student who does not know how to typewrite. Miss Davis. Prereq.: Permission of instructor. 5 lab.; 1 cr.

7-8. Typewriting. Practice in acquiring correct typewriting techniques, and in arranging letters, tabulations, and simple manuscripts. Miss Davis. Prereq.: Permission of instructor. 5 lab.; 2 cr. *(See Secl. 27.)*

9-10. Advanced Typewriting. Practice in tabulating and in writing business letters, legal papers, and various business forms. Miss Davis. Prereq.: Secl. 8 or the equivalent and permission of the instructor. 5 lab.; 2 cr.

11. Filing. Various alphabetic, numeric, geographic, and subject-matter systems of correspondence filing; cross reference; follow-up methods; filing supplies and equipment. Miss Davis. Prereq.: Secl. 7 and permission of instructor. 3 lec.; 2 cr.

(13). Office Machines. Duplicating methods; practice in typing master copies and stencils, and in operating an electric typewriter, a mimeograph, a mimeoscope, and a liquid process duplicator; practice in machine transcription; and an introduction to adding and calculating machines. Miss Davis. Prereq.: Secl. 8 and permission of instructor. 5 lab.; 2 cr.

17-18. Secretarial Office Procedure and Practice. First semester, discussion of secretarial duties and traits; problems in the discharge of vari-

ous duties; and problems in office management. Second semester, 144 hours of practice secretarial work in business offices. Miss Tyrell. This course must be taken in conjunction with Secl. 3-4 and Secl. 9-10, or following these courses and with permission of instructor. 3 rec.; 3 cr.

22. Advanced Dictation. Speed building in dictation and transcription. Miss Tyrrell. Prereq.: Secl. 4 and permission of instructor. 3 rec.; 3 cr.

23-24. Business Writing. Review of grammar, word usage, punctuation, and sentence construction. Practice in writing various types of business letters and reports; proofreading; editing. Prereq.: One semester of typewriting preceding this course or taken in conjunction with it. Miss Tyrell. 3 lec. or rec.; 3 cr.

27. Typewriting. Practice in acquiring typewriting techniques, and in arranging letters, tabulations, and simple manuscripts. This course, which begins on November 4, 1962, is to be taken instead of Secl. 7 by Secretarial students who have had Secl. 5 or the equivalent. Prereq.: Secl. 5 or equivalent and permission of instructor. Miss Davis. 5 lab.; 1 cr.

Economics

Register for the following courses as Econ. 1, etc.

1-2. Principles of Economics. The principles which explain the organization and operation of the economic system. Mr. Bassett, Mr. Degler, Mr. Hogan, Miss Woodruff, and Mr. Rosen. *Not open to freshmen.* 3 lec.; 3 cr.

3, (3). Economic and Commercial Development of the United States. Historical survey of American business and industry with emphasis on the period since 1860. Miss Woodruff. 3 lec.; 3 cr.

9. Transportation. The economic significance of transportation; its influence on the location of economic activity. Development, organization, and regulation of transportation agencies. Mr. Michman. Prereq.: Econ. 2. 3 lec.; 3 cr.

25. Marketing. The distribution of goods in the United States. The marketing behavior of the firm and its consquences for the economy as a whole. Price competition, the nature and economic significance of non-price competition. The influence of technology on market structure. Prereq.: Econ. 2. 3 lec.; 3 cr.

31, (31). Statistics for Economics and Business. Methods of collection, analysis, and presentation of statistical data. Statistical technique as an aid in decision making in business and economics. Required of all students majoring in Economics and in the Business curricula. Mr. Bergeron. Prereq.: Econ. 2. 3 lec.; 3 cr.

51. Labor Economics. Historical background and present status of labor organizations and problems. Labor-management relations and collective bargaining; economics of wages and employment; case studies. Mr. Hogan. Prereq.: Econ. 2. 3 lec.; 3 cr.

52. Public Finance. Problems and policies of expenditure, revenue and debt of federal, state, and local governments. Economic analysis and evaluation of individual types of taxes as well as entire government fiscal programs; critical appraisal of recommended changes in tax systems; tax problems in the State of New Hampshire. Mr. Rosen. Prereq.: Econ. 2. 3 lec.; 3 cr.

53. Money and Banking. The monetary and banking system with reference to monetary standards, value of money, commercial and non-commercial banking, and structure and policy of the Federal Reserve System. Mr. Degler. Prereq.: Econ. 2. 3 lec.; 3 cr.

54. Advanced Money and Banking. Advanced monetary theory and some of the more practical aspects of modern banking. Mr. Degler. Prereq.: A satisfactory average in Econ. 53. 3 lec.; 3 cr. (Alternate years; offered 1962-63.)

55. Corporations. The forms of business organization with special emphasis on the corporate system, combination, and concentration. Mr. Degler. Prereq.: Econ. 2. 3 lec.; 3 cr.

56. Corporation Finance. Corporate securities, methods of financing, and financial policy. Mr. Degler. Prereq.: Econ. 2. 3 lec.; 3 cr.

58. Principles of Investment. The problems of investment; investment characteristics of stocks and bonds; public utility, railroad, industrial, and government securities; protection of the investor; investment banking; and related problems. Mr. Degler. Prereq.: Econ. 2. 3 lec.; 3 cr. (Alternate years; not offered 1962-63.)

63. International Trade and Finance. Theory of international trade, foreign exchange, balance of international payments, tariffs and protection; the economic aspects of international relations, with particular reference to recent policies. Miss Woodruff. Prereq.: Econ. 2. 3 lec.; 3 cr.

64. Comparative Study of Economic Systems. An examination of socialism, communism, capitalism, and modifications of these types, particularly as exemplified by leading nations. Miss Woodruff. Prereq.: Econ. 2 or permission of instructor. 3 lec.; 3 cr.

73. Value and Distribution. Analysis of supply and demand. The determination of prices, production, and the distribution of income in realistic non-competitive situations as well as in the purely competitive model. General equilibrium. Mr. Bergeron. Prereq.: Econ. 2. 3 lec.; 3 cr.

75. National Income. The measurement, theory, and public policy applications of national income. Mr. Rosen. Prereq.: Econ. 2. 3 lec.; 3 cr.

76. Economic Fluctuations. (Business Cycles). Study of recurrent movements of prosperity and depression, with emphasis upon causes and public policy applications. Mr. Rosen. Prereq.: Econ. 2 and one additional semester course in Economics or permission of the instructor. 3 lec.; 3 cr.

78. History of Economic Thought. Traces the evolution of economic science. Examination and critical appraisal of the work of major economists and major schools of economists, particularly with reference to the applicability of their theories to current economic problems and the extent to which their theories infiuence modern economics. Mr. Bergeron. Prereq.: Econ. 2. 3 lec.; 3 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

ZOOLOGY

GEORGE M. MOORE, *Professor;* C. FLOYD JACKSON, *Professor Emeritus;* LORUS J. MILNE, *Professor;* EDYTHE T. RICHARDSON, *Professor;* EMERY F. SWAN, *Associate Professor;* WILBUR L. BULLOCK, *Associate Professor;* PAUL E. SCHAEFER, *Associate Professor;* MARIAN H. PETTIBONE, *Associate Professor;* PAUL A. WRIGHT, *Associate Professor;* PHILIP J. SAWYER, *Associate Professor;* MARCEL E. LAVOIE, *Associate Professor;* ARTHUR C. BORROR, *Assistant Professor;* ALAN G. LEWIS, *Assistant Professor;* WINIFRED A. BURBEE, *Instructor;* BURTON C. STAUGAARD, *Instructor*

7. GENERAL ZOOLOGY. Systematic survey of the animal kingdom, including the natural history and functional relationships, accompanied by dissection of selected types. Prereq.: Biol. 2, 3, or Zool. 48. 3 lec.; 2 lab.; 5 cr.

8. COMPARATIVE ANATOMY. Fundamental principles of comparative vertebrate anatomy. Selected vertebrate types are dissected. Prereq.: Zool. 7. 3 lec.; 2 lab.; 5 cr.

17. HUMAN ANATOMY. The structure of the human body including gross and microscopical anatomy of the various systems. Mr. Lavoie. Prereq.: Biol. 2 or 3. 3 lec.; 1 lab.; 4 cr. *(Not open to those who have credit for Zool. 8.)*

18. HUMAN PHYSIOLOGY. The principles involved in the functioning and integration of the various systems of the body. Mr. Lavoie. Prereq.: Zool. 17 or Zool. 8. 3 lec.; 1 optional lab.; 3 or 4 cr.

19. KINESIOLOGY. Bodily movements. The relation of skeleton, muscles, and joints in movements. Designed primarily for Occupational Therapy students and for students in the Physical Education Teacher Preparation curriculum. Mrs. Richardson. Prereq.: Zool. 18. 2 lec.; 1 lab.; 3 cr.

36. ORNITHOLOGY. Birds, their identification, migration, life-history, and economic importance with special reference to those of eastern North America. Mr. Sawyer and Mr. Borror. Prereq.: Biol. 2 or 3 or equivalent. 1 lec.; 2 lab. or field trips; 3 cr.

48. PRINCIPLES OF ZOOLOGY. The principles of animal biology, including ecological relationships, embryology, physiology, and genetics, with emphasis on man and other vertebrates. Mr. Bullock. *Required of freshmen in Agriculture.* 2 lec.; 1 lab.; 3 cr. *This course cannot be used to satisfy major requirements.* (Not open to those who have credit for Biol. 1-2, or 3.)

51. PARASITOLOGY. An introductory course on some of the more important parasites causing diseases of man and animals. Mr. Bullock. Prereq.: Biol. 2, or 3, and a year of Zoology. 2 lec.; 2 lab.; 4 cr.

52. WILDLIFE PARASITOLOGY. Some of the common helminth and protozoan parasites of local marine, freshwater, and terrestrial vertebrates. Techniques for examination, collection, staining, and identification are included. Mr. Bullock. Prereq.: General Zoology. 2 rec.; 2 lab.; 4 cr. *(Offered in Summer only.)*

55, 56. INVERTEBRATE ZOOLOGY. The morphology, phylogeny, and natural history of the major invertebrate groups. Staff. Prereq.: General Zoology. 2 rec.; 2 lab.; 4 cr.

57. COMPARATIVE PHYSIOLOGY. A survey of means whereby animals, both vertebrate and invertebrate, have met the problems of irritability, nutrition, maintenance of a constant internal environment, and reproduction. Mr. Lavioe. Prereq.: Biol. 2, or 3, one year of Zoology, college Physics, and Organic Chemistry. 3 lec.; 1 lab.; 4 cr.

59. General Physiology. The fundamental physiological properties of excitability, contractility, conductivity, metabolism, growth, and reproduction. Mr. Wright. Prereq.: Biol. 2, or 3, one year of Zoology, college Physics, and Organic Chemistry. 3 lec.; 1 lab.; 4 cr.

61. Genetics. The physical basis of inheritance, expression, and interaction of the hereditary units, linkage, and variation. The application of Mendelian principles to plant and animal breeding. Mrs. Richardson. Prereq.: Biol. 2, or 3, or Bot. 1 and Zool. 48. 3 lec.; 3 cr.

62. Advanced Genetics. The recent advances in genetics and cytogenetics. Mrs. Richardson. Prereq.: Zoology 61. 2 lec.; 2 lab.; 4 cr.

64. Neurology. Practical study of morphology, physiology, and histology of the human nervous system. Mrs. Richardson. Prereq.: Biol. 2, or 3, and one year of Zoology. 3 lec.; 1 lab.; 4 cr.

65. Embryology. The fundamental principles of development. The developmental process from the egg to the formation of the body and the establishment of the principal organs and systems. Mr. Staugaard. Prereq.: Zool. 7. 2 lec.; 2 lab.; 4 cr.

66. Elements of Histology and Microtechnique. The microscopic anatomy of principal tissues and organs of vertebrates with an introduction to general histological techniques. Mr. Staugaard. Prereq.: Zool. 8 or 17. 2 lec.; 2 lab.; 4 cr.

68. Natural History of Marine Inverterbates. A field and laboratory course aiming at acquainting the student with the inshore marine invertebrate metazoan animals of northern New England. Emphasis will be on identification, classification, habitat preferences and behavior of these animals. Field work (collections and observation) will constitute a major part of the course. Mr. Swan. Prereq.: General Zoology. 1 lec.; 3 lab.; 4 cr. (*Offered in Summer only.*)

71. Principles of Ecology. The interrelationships of plants and animals with both their living and non-living environments. Attention will be given to energy relationships, limiting factors, community organization, succession and biogeography. Mr. Swan. 3 lec.; 3 cr.

72. Advanced Ecology. (a) Terrestrial, (b) Freshwater, (c) Marine. An intensive study of the ecology of one of the major habitat areas with the application of general ecological principles and of methods especially applicable to the habitat studied. Staff. Prereq.: A course in Principles of Ecology and permission of the instructor. 2 lec.; 2 labs.; 4 cr. Different subdivisions of this course may be taken to a total of not more than 12 credits.

76. Invertebrate Embryology. The developmental patterns as exhibited by the major invertebrate groups. This will be essentially a descriptive study based upon lectures, library work, and laboratory work with living material. Prereq.: General Zoology. 2 lec.; 2 lab.; 4 cr. *(Offered in Summer only).*

77, 78. Natural History and Taxonomy of the Vertebrates. A study of the various classes of vertebrates; their habits, habitats, and life histories with special reference to those occurring in eastern North America. Zo-

ology 77 will include the fishes, amphibia, and reptiles. Zoology 78 will cover the mammals and birds. Mr. Sawyer. Prereq.: General Zoology. 2 lec.; 2 labs.; 4 cr.

97, 98. Special Problems. Advanced students may elect a special problem provided they present a detailed outline of the subject and can furnish adequate proof of their ability to carry it out with equipment available. Mr. Moore and staff. Prereq.: Permission of the Chairman of the Department. 1-4 cr.

FOR COURSES PRIMARILY FOR GRADUATE STUDENTS SEE CATALOGUE OF THE GRADUATE SCHOOL

Summary of Registration

	Agriculture				Liberal Arts				Technology				Miscellaneous				Total											
																	Men				Women				Both			
	1960-61	1959-60	1958-59	1957-58	1960-61	1959-60	1958-59	1957-58	1960-61	1959-60	1958-59	1957-58	1960-61	1959-60	1958-59	1957-58	1960-61	1959-60	1958-59	1957-58	1960-61	1959-60	1958-59	1957-58	1960-61	1959-60	1958-59	1957-58
Senior	49	62	65	80	521	517	493	483	136	129	153	144	.....	.....	.....	.....	503	498	490	514	203	210	221	193	706	708	711	707
Junior	63	42	61	68	606	536	530	525	129	153	177	191	.....	.....	.....	.....	467	468	547	547	331	263	221	237	798	731	768	784
Sophomore	78	69	45	69	674	657	567	511	151	158	180	204	.....	.....	.....	.....	547	574	530	554	356	310	262	230	903	884	762	784
Freshman	77	76	84	57	806	696	714	571	246	256	263	248	.....	.....	.....	.....	655	637	650	585	474	391	411	291	1129	1028	1061	876
Specials	7	6	7	12	63	76	85	75	6	13	20	24	.....	.....	.....	.....	32	60	89	76	44	35	43	35	76	95	132	111
Graduate	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	340	252	249	242	264	197	211	193	76	55	38	49	340	252	249	242
Total—Regular curricula	274	255	262	286	2670	2482	2389	2165	668	709	793	811	340	252	249	242	2468	2434	2517	2469	1484	1264	1196	1035	3952	3698	3713	3504
Non-degree curricula																												
2nd year, TSA	24	29	22	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22	27	20	27	2	2	2	1	24	29	22	28
1st year, TSA	38	40	55	39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34	40	55	38	4	.....	.....	1	38	40	55	39
Total	62	69	77	67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	56	67	75	65	6	2	2	2	62	69	77	67
Summer School	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1228	1127	934	801	695	628	544	408	533	499	390	393	1228	1127	934	801
Extension courses	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	†1971	†1735	*884	.....	1275	1072	549	.....	696	663	335	.....	1971	1737	884
Credit	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2022	.....	.....	.....	1215	.....	.....	.....	807	.....	.....	.....	2022	.....	.....	.....
Non-credit	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	359	.....	.....	.....	276	.....	.....	.....	83	.....	.....	.....	359	.....	.....	.....
General Electric	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59	44	52	39	59	44	52	39	.....	.....	.....	.....	59	44	52	39
Total—short curricula	62	69	77	67	.....	.....	.....	.....	.....	.....	.....	.....	3668	3142	2721	1724	2301	2014	1743	1061	1429	1197	1055	730	3730	3211	2800	1791
Grand Total	336	324	339	353	2670	2482	2389	2165	668	709	793	811	4008	3394	2970	1966	4769	4448	4260	3530	2913	2461	2251	1765	7682	6909	6511	5295
Less duplicates	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	911	479	279	265	676	348	233	158	235	131	46	107	911	479	279	265
NET GROSS TOTALS	336	324	339	353	2670	2482	2389	2165	668	709	793	811	3097	2915	2691	1701	4093	4100	4027	3372	2678	2330	2205	1658	6771	6430	6232	5030

* Semester I 1957-58.

† Semester I and II, 1958-59 and thereafter.

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